DOCUMENT RESUME

ED 301 656 CE 051 291

AUTHOR	Copa, George H.; Johnson, Marilyn A.
TITLE	Vocational Education and High School Graduation Requirements.
INSTITUTION	Minnesota Univ., St. Paul. Minnesota Research and Development Center for Vocational Education.
SPONS AGENCY	Minnesota State Board of Vocational-Technical Education, St. Paul.; Minnesota State Dept. of Education, St. Paul.
PUB DATE	Sep 88
NOTE	148p.
PUB TYPE	Reports - Research/Technical (143)
EDRS PRICE	MF01/PC06 Plus Postage.
DESCRIPTORS	Credits; Educational Needs; *Educational Policy; *Educational Practices; *Graduation Requirements; High Schools; Required Courses; *State Standards; *Vocational Education
IDENTIFIERS	*Minnesota; Ohio; Virginia; Washington

ABSTRACT

A study investigated the ways in which vocational education is related to high school graduation requirements in Minnesota and several other states (Ohio, Virginia, and Washington). A review of literature showed the historic development of high school graduation requirements, the role of vocational education in secondary schools today, and vocational education's relationship to graduation requirements. Data for the study were collected through extensive telephone and in-person interviews at state offices and selected local school sites in Minnesota and the other states. Review of the data revealed a variety of ways in which vocational education related to high school graduation requirements. For example, in many cases, vocational agriculture or principles of technology courses were used to meet the state-mandated science requirements. Some schools discovered problems with such an arrangement because of confusion over whether academic or vocational teachers should teach such courses. Another option was to have academic teachers teach applied mathematics, science, and communications courses, rather than use vocational courses to meet graduation requirements. Concerns were voiced in several areas that increased graduation requirements would draw students away from vocational education, unless ways were found to use vocational education to meet requirements or to rewrite requirements in terms of competencies rather than credit hours. Policy questions regarding evaluation of vocational education courses were raised. Twenty-nine references are listed; the survey form and interview protocols are appended. (KC)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED301656

Minnesota Research and
Development Center for
Vocational Education

Vocational Education and High School Graduation Requirements

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☑ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality
- Points of view or opinions stated in this document do not necessarily represent official OERI position or policy

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
D Pucel
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

Minnesota Research and Development Center
for Vocational Education
Department of Vocational and Technical Education
College of Education
University of Minnesota
St. Paul, Minnesota 55108

051291

VOCATIONAL EDUCATION AND HIGH SCHOOL GRADUATION REQUIREMENTS

BY

GEORGE H. COPA

MARILYN A. JOHNSON

SEPTEMBER 1988

Minnesota Research and Development Center
for Vocational Education
Department of Vocational and Technical
Education
University of Minnesota
St. Paul, Minnesota 55108

© Copyright 1988, MRDC

Funding for this project was provided by the State Board of Vocational Technical Education, the Minnesota Department of Education, and the Department of Vocational and Technical Education, University of Minnesota.

Interpretations of the findings described in this report represent those of the authors, and are not necessarily those of the State Board of Vocational Technical Education, the Minnesota Department of Education, of the University of Minnesota.

The University of Minnesota is committed to the policy that all persons shall have equal access to its programs, facilities, and employment without regard to race, religion, color, sex, national origin, handicap, age, veteran status, or sexual orientation.

PREFACE

The conduct of this study was motivated by discussions during the research priority setting process of the Minnesota Research and Development Review Committee for Vocational Education. This Committee advises the State Director of Vocational Education concerning the most important areas of policy and practice in vocational education needing attention through research and development as a means to improve vocational education in Minnesota.

Funding for doing this study was provided under the joint auspices of the Minnesota State Board of Vocational Technical Education, the Minnesota State Board of Education and by the University of Minnesota. These resources were critical in providing the opportunity to respond to the research and development needs identified by the Review Committee.

During the course of the study, more specific direction and guidance was provided by a Project Advisory Committee made up James Cole, Jeanette Daines, Rod Hale, Peggy House, Don Johansen, Ron Johnson, John Mercer, Jane Plihal and James Stone. Rod Hale had the special responsibility of linking discussions in the Research and Development Review Committee, of which he is a member, with discussions in the Project Advisory Committee. We wish to acknowledge the wise counsel provided by members of the Advisory Committee, particularly in keeping us sensitive to the larger context in which the study was being conducted.

Special recognition is due the many informants who provided the data without which this study report would not exist. As promised during the data collection process, these informants remain anonymous. However, their willingness to take time to respond to questions, to show and explain, to share materials, and to be open and frank are a tribute to their professionalism. To the many state and local educational agency individuals in Minnesota, Ohio, Virginia and Washington involved in this study, we

remain very grateful for your willing participation. We hope this report provides one form of repayment for your generosity in time and attention with us.

Last, we wish to thank the secretarial staff of the Minnesota Research and Development Center for Vocational Education at the University of Minnesota for assistance all through this study. Their diligence in transcribing tape recordings of interviews and preparing this report are especially appreciated.

TABLE OF CONTENTS

Page

Preface. ii

Chapter 1: Context for Study. 1

Background Consideration. 1
Minnesota's High School Graduation Requirements. 2
Purposes of the Study 4

Chapter 2: Related Literature 7

History of Graduation Requirements. 7
Vocational Education and Secondary Education. . . . 11
Vocational Education and High School Graduation Requirements. 23
Methods of Studying the Relationship. 37
Summary 38

Chapter 3: Method of Study. 41

Advisory Committee. 41
Site Selection. 41
Data Collection 44
Data Analysis and Interpretation. 45

Chapter 4: Description of Sites 47

State of Minnesota. 47
State of Washington 62
State of Ohio 66
State of Virginia 71

Chapter 5: Policy Issues and Options. 79

Motivation. 80
Relationships 87
Process of Relating 87
Facilitators and Barriers 112
Consequences. 119

Chapter 6: Conclusions and Recommendations. 123

Vocational Education and Graduation Requirements. . 123
Relating Vocational Education to Graduation Requirements. 124

Dealing with Barriers and Facilitators to the Relationship. 125
Summary 126

References 129

Tables

Table 1: Minnesota High School Course Offerings Requirements and Graduation Requirements (Grades 10-12) 3
Table 2: Project Advisory Committee Members 42

Exhibits

Exhibit 1: Example of Local School Policy Regarding Process for Obtaining Equivalency Credit for Vocational Education. 89
Exhibit 2: Example of School Board Resolution Authorizing Use of Vocational Education Course to Meet Academic Graduation Requirement. 90
Exhibit 3: Example of Process Used to Related Content of General Science Course to Vocational Education Courses Titled National Resources, Horticulture, Forestry 92
Exhibit 4: Examples of Equivalencies Between Vocational Education Courses and Academic Courses Required for Graduation 93
Exhibit 5: Example of Correlation Chart Showing Relation Between Vocational and Academic Courses in an Area Vocational Secondary Center 98
Exhibit 6: Example of Publicizing Relationship Between Vocational Education Courses and Graduation Requirements in Student Registration Booklet 101
Exhibit 7: Table of Contents of Guide to Assist Local Administrator in Relating Vocational Education to Graduation Requirements 103
Exhibit 8: Example of State Level Guidelines for Using Vocational Education as an Alternative Way to Meet Graduation Requirements 105

Exhibit 9: Example of Common Questions and Answers for Introducing New Structure of Program Options and Applied Academic Courses in Ohio's Secondary Area Vocational Centers 110

Appendices

Appendix A: Survey to Identify Potential Minnesota Sites 133
Appendix B: State and Local School Interview Protocols 134

CHAPTER 1

CONTEXT FOR STUDY

The purpose of this research was to examine the relationship between vocational education and high school graduation requirements. More specifically, the intent was to describe this relationship as it exists in several schools in Minnesota as well as in other states where vocational education explicitly is used to assist students in meeting high school graduation requirements. From these descriptions, policy issues which need attention in fostering the relationship between vocational and graduation requirements were identified and resolutions investigated.

Background Consideration

The Minnesota Research and Development Review Committee for Vocational Education advises the Minnesota Board of Education and Minnesota Board of Vocational Technical Education on research and development problems which need addressing to improve vocational education in Minnesota. For 1986-88, the Committee identified the following research problem as very high priority:

> Define the role of secondary vocational education in the mission of secondary education, including how vocational education contributes to the development and application of high school requirements and how this education (vocational) can qualify as meeting those requirements.

The research described in this paper was designed in response to the above high priority research problem.

There were several reasons for being concerned with the role of vocational education in the mission of secondary education. These reasons have already been identified in previous research reports published by the Minnesota Research and Development Center for Vocational Education (Copa, Daines, Ernst, Knight, Leske, Persico, Plihal & Scholl, 1985; Copa, Plihal, Scholl, Ernst, Rehm, & Copa, 1986; and Copa, Plihal & Johnson, 1986). The reports form the results of a program of research addressing the role of vocational education in the secondary school.

Some of the reasons for concern about the role of secondary vocational education cited in these reports are:

1. Vocational education's emphasis on the concepts of development, individual differences, education, vocation, work, ethics and aesthetics.

2. Vocational education's response to a series of philosophic tensions in education (i.e., maintaining the status quo versus changing society, general education versus specific education, education versus training, technology versus human development, efficiency versus equity).

3. Vocational education's multiple purposes in addressing the needs of students by building competence, applying the basics, helping them think through problems, learning technical skills, exploring life roles, learning to work together, extending self to community, expressing self and going on stage with life roles.

4. Vocational education's function in the school by changing the pace for learning, providing an appropriate education, giving meaning to school, and considering fairness at school.

5. Vocational education's needed revisions to make it better for secondary school students, to include: (a) revising the meaning of vocational education (i.e., clarifying direction, deciding who should be served, examining the values underlying the mission, resolving the issue of specific job training, listening to the viewpoint of others about the mission, selecting language to garner power); (b) considering the restructuring of vocational education (i.e., shifting to bottom-up decision making, building flexibility into the system, thinking of education as one system, assuring access by all, offering courses rather than programs); (c) integrating vocational education with the rest of education (i.e., initiating integration into the comprehensive school, working at differentiating and integrating subjects, aiming at unifying life roles); (d) improving the competence of vocational educators (i.e., recruiting better vocational educators, improving the competence of existing practitioners, emphasizing leadership skills and roles).

These reasons suggest a significant role for vocational education in secondary education. The recognition of this role sometimes appears at odds with present high school graduation requirements in Minnesota.

Minnesota's High School Graduation Requirements

Minnesota's high school graduation requirements can be expressed in two different ways: (a) as a set of required minimum course credit offerings to be made available to students in each school district, and (b) as a set of minimum required course credits for graduation. These two ways of viewing requirements are shown in Table 1.

Table 1

Minnesota High School Course Offerings Requirements and Graduation Requirements (Grades 10-12)

Subject	Numbers of credits to be offered[1]	Number of credits for graduation[2]
Communication skills	4	3
Mathematics	3	-
Science	3	-
Social studies	3	2
Foreign language	2	-
Music	2	-
Visual arts	2	-
Industrial arts	1	-
Health	1/2	1/2
Physical education	1/2	1/2
Electives (in five subjects)	10	-
Total	na	15

Note. One credit equals 120 hours of instruction.

---

[1] Rules of State Board of Education, Section 3500.2010, Required curricular Offerings for Three-Year Senior Secondary Schools, published in 1984.

[2] Rules of State Board of Education, Section 3500.2000, Curriculum for Three-Year Senior Secondary Schools and Section 3500.3100, Completion of Secondary School Requirements.

From reviewing the information in Table 1, it is evident that the offering requirements are much more extensive than graduation requirements. Many Minnesota high school districts have set graduation requirements above those described for the state. Missing altogether is a requirement for vocational education in either offerings (except for industrial arts) or graduation requirements. In this context, vocational education is viewed as an elective.

The state graduation requirements specified in Table 1 were approved by the Minnesota Board of Education some time ago. In 1984, the requirements for offerings were added to rules and regulations to be effective in the 1986-87 school year. A specific offering requirement for vocational education was debated but later dropped from consideration by the Board.

The impact of the state's required offerings on the elective status was overshadowed by the preparation requirements approved by the University of Minnesota's Board of Regents in 1986. These requirements for all undergraduate programs will go into effect in 1991-92. The preparation requirements include four years of English, two years of social studies, three years of mathematics, three years of science, and two years of foreign language. Students who enter the University without these requirements will need to fulfill the requirement before being permitted to enter upper division courses. While courses to meet the preparation requirements will be offered at the University, students will not be given credit for these courses as part of their undergraduate programs. This new requirement by the University of Minnesota, while affecting a relatively small group of students (i.e., those entering the University), may have a pervasive effect of increasing the desirability by students and parents of courses meeting the requirements to the marked disadvantaged of other courses such as vocational education.

Given these events, leaders in vocational education perceived that vocational education's role as an elective could be strengthened if it was viewed as an alternative means of meeting state and local school graduation requirements as they relate to communication skills, mathematics, science, social studies, visual arts and health (and the preparation requirements of the University). This was an important motivator for the Review Committee's high priority for specific study of the relationship of vocational education and high school graduation requirements.

Purposes of the Study

As noted in the beginning of this paper, the focus of the study was on the relationship of vocational education and high school graduation requirements. Attention was to be given to high schools in Minnesota and other states which have arrangements for granting credit for vocational education in meeting high school graduation requirements.

The specific purposes of the study were:

1. Identify and describe high schools in Minnesota and other states where vocational education courses are being used to meet high school graduation requirements.
2. Define policy issues which need to be addressed in increasing vocational education's role in meeting high school graduation requirements.
3. Describe alternative resolutions to these policy issues as they exist or are being developed in school sites in Minnesota or other states.

CHAPTER 2

RELATED LITERATURE

This chapter will serve to review the literature relating vocational education and high school graduation requirements. The chapter starts with a brief description of the historic development of high school graduation requirements in the United States. From there, the focus shifts to the role of vocational education in secondary schools today, and more particularly, vocational education's relationship to graduation requirements. The last section of the review describes the research method used in previous studies of the kind being conducted here.

History of Graduation Requirements

As measures of performance, requirements for graduation from high school developed over the years to serve particular purposes in schools and society. As the nature and goals of education changed, so did the performance standards. In the earliest American high schools, mastery of academic subjects, valued as "cultural capital" by elites and the aspiring middle class, was measured by yearly non-standard oral examinations. The present system of required course credits has emerged from successive transformations in the social functions of the public high school.

Functional sociologists hold the position that the needs of society determine performance standards for education, which in turn determine what is taught. "Performance standards within the educational system are ultimately derived from the cultural and technological need of the larger society, and thus provide a framework for organizing instruction, transmitting knowledge, and inculcating norms related to achievement" (Serow, 1986, p. 19).

Another view, educational credentialism, suggests that it is the extrinsic value of educational diplomas which has led to the rise of mass education. Max Weber viewed credential-based selection of those most qualified to exercise responsibility in society as the by-product of an emerging bureaucratic form of social organization. Contemporary critics, however, view credentialing as encouraging a "wholly instrumental approach to education." The economic rewards associated with education put enormous pressure on schools to provide broader access to credentials which, in turn, has led to softer standards in many institutions. Serow (1986) provides a review of the evolution of high school graduation requirements from this credentialist perspective. His perspective, which was the only major piece of work on this topic able to be found, is summarized here in order to provide an historical perspective on recent trends toward increasing graduation requirements.

Tailoring for Middle Class Culture

In the mid-1800s, public high schools emphasized the mastery of formal aspects of culture. Thoroughly dominated by the middle class, public high school academic programs were tailored to middle class cultural tastes and social aspirations. The prospect of forgone income kept pupils from the working class out of the high school. And, with most occupational skills acquired through apprenticeship or on the job, high schools had little to offer the typical working class adolescent. Liberal arts subjects dominated the curriculum and formal discipline was seen in the method of instruction. Examinations were the most common criterion for grade promotion and graduation.

Developing the Credit System

Course credits as a standard measure of progress emerged as "one of the most important steps in school-to-college articulation" (Serow, 1986, p. 25). In the late 1800s, middle class aspirations began shifting from high schools to colleges. The college diploma promised ready access to the professions and the high school diploma became the key to entering college. However, variability in local standards was a problem for the colleges. The credit or unit system emerged as a compromise between claims for local autonomy and colleges' need for standardization.

The National Education Association originally set the conditions for credit acceptable for high school graduation and college entrance. Credit was to be earned only in a small number of academic subjects, taught in conventional modes. After the turn of the century, the Carnegie Foundation for the Advancement of Teaching further stipulated that courses must meet for a minimum of 40 minutes, 4 times per week, and 36 weeks per year in order to earn one credit. A fully articulated system of credentialing had been established. "The cornerstone of the new system was the principle that the number of credits...required in each field would be determined by the subject's contribution to the...academic knowledge that students would need to succeed in college and/or in adult life" (Serow, 1986, p. 25).

Implementing Compulsory Secondary Education and Comprehensive High Schools

The main obstacle to universal secondary education had been the need for most children to work as soon as they were physically capable. However, with industrialization and growing numbers of immigrants, the demand for youth labor declined by the 1920s, and a favorable public attitude toward compulsory education grew. With urban problems growing more severe, compulsory education was expected to "enhance the potential of the public school as both a socializing (Americanize the immigrants) and a "custodial agency" by keeping troublesome youth off the streets and out of the labor markets, and at the same time teaching basic language and occupational skills" (Serow, 1986, p. 27). The public high school, initially geared toward a small, relatively ambitious segment of the middle class, was not prepared for thousands of youth suddenly enrolled because they were legally compelled to do so.

Grade retention and school attrition became items of great concern. Questions were raised about the intellectual ability and interests of these new students and about how much education they actually needed. If 12 years of schooling was desired, then promotion policies needed to be changed.

After 1920, graduation requirements were modified to retain more students. First, the credit load was split between the core curriculum and electives, allowing a third of all credits to be earned outside the academic areas. Less successful students were steered to vocational education as a "partial solution." Second, more flexible grading practices were encouraged in academic subjects. Mastery of subject content became less important than a student's ability to complete prescribed courses. A third reform was differentiation of instruction. Teachers began to sort students and coursework within subjects, assigning average and below average students to "general" classes consisting of simpler and applied content. Enrollment in vocational and general courses jumped dramatically.

Increasing Program Options and Electives

The 1960s saw renewed emphasis on increasing program options and electives in the high school curriculum. The high school curriculum was being reshaped by two social and cultural currents sweeping American education: the effort to provide equality of opportunity for minority and low-income youth and the renewed interest in the non-academic aspect of adolescent development. "Common to each were the goals of making the schools more responsive to their surrounding communities, reducing youth alienation and social tension, and enhancing the role of public education in the process of social change and amelioration" (Serow, 1986, p. 31). Many compensatory and multi-cultural programs were initiated to improve equity and relevance. Various groups recommended a de-emphasis of traditional academic programming.

By 1972 students had unprecedented freedom in designing their own courses of study, with options for fulfilling diploma requirements in virtually every subject. High schools adopted the free market approach to curriculum planning long used in colleges. Courses were forced to compete for enrollments. One latent goal of program planning, writes Serow, was to occupy students with peaceful, if not always productive activity, or to "get them in, keep them busy, and get them out." In the 1960s then, high schools came to be regarded as instruments of social reform, and emphasis on academics declined as the subject centered curriculum gave way to unrestricted electives within disciplines (Serow, 1986, p. 37).

In today's world, secondary education is no longer thought to be a guarantee into middle class. It is necessary, but not enough. As postsecondary institutions are now seen as the point for social selection, high schools are "best understood as upward extensions of the elementary grades." Serow continues, "The current crisis in secondary education is primarily a matter of lagging perceptions of the goals and purposes of the high school...The most important instructional objectives of the high school may be to inculcate the lower-order competencies upon which more advanced and specialized skills are based" (1986, p. 37).

Questioning Academic Excellence Through Credit Requirements

Based on this credentialist analysis, Serow questions the present campaign for academic excellence. First, by focusing on credit requirements, the more fundamental issues of quality and depth of instruction may be forgotten. There has been a persistent complaint about the standard unit (credit) almost from its inception. Many considered it a detriment to learning and measuring real knowledge. Over fifty years ago one critic said, "It is far easier to prescribe length of class periods, number of units for graduation...than to initiate a standard which will more directly influence the teaching process itself" (cited by Serow, 1986, p. 37).

A second issue, Serow notes, is whether the reform movement has taken into account the fact that performance standards have emerged from broader changes in secondary education. As secondary education became universal in the United States, schools have added to academic training a responsibility for the "custody and socialization of large numbers of youth who may have little interest in academics and perhaps little prospect of successfully fulfilling the new requirements...The question may be whether a system of pupil certification devised to insure access and flexibility can be suddenly expected to serve the quite different goals of academic excellence" (1986, p. 38).

Vocational Education and Secondary Education

Although the goals of secondary education in this country are not entirely consistent from district to district, there are many common goals stated in school board documents and on the front pages of student handbooks. There is abundant literature about the purposes of high school. The earliest high schools were expected to maintain the social and cultural status of the elites, while latter purposes emerged as (a) preparation for higher education, (b) socialization of immigrants, (c) custodial care of troublesome youth (reduction of alienation and social tension), (d) keeping youth out of the crowded labor market, and (e) training for eventual employment.

Vocational education, as a general goal of education, has been documented in national reports of education committees and task forces for over 100 years (Barlow, 1986). John Goodlad, in a recent study of the public education goal statements of 50 states, found a societal expectation for "...academic/ intellectual, societal/citizenship, vocational, and personal goals, with subgoals defining them further and with admonitions regarding the importance of every student...all four goal areas were judged to be 'very important' or 'essential'" (cited in Chialtas, 1986, p. 12). Goodlad also found that society's expectations endure over time in spite of cycles of retreat and resurgence of interest with "resolve to make the reality of schooling live up to our goals" (Cited in Chialtas, 1986, p. 12).

Copa (1983, 1984) traces the role of vocational education in the comprehensive high school since the term "comprehensive" was first used in reference to the high school by the Commission on Reorganization of Secondary Education appointed in 1913 by the National Education Association. Comprehensive high school meant a school that embraced all curriculum in one unified organization. "Preparation for vocation" was one of seven cardinal principles identified by the Commission. Vocational education in the secondary school grew rapidly after that time. Cycles were noted in curricular reform over the 70 years to the present with the curriculum of the high school moving in waves, altering toward more electives and flexibility in curriculum and programs on the one hand, and toward constriction on the other, with reemphasis on certain aspects of the curriculum. The review showed the movement from the stern learning environment of the early schools to the progressive movement of the '20s and '30s, to a return to mental discipline the '40s, to "new" mathematics and physics in the '50s and '60s, to attempts to humanize and "open" the schools in the '70s, to higher expectations and more discipline and rigor today. Copa (1984) notes, "Perhaps an optimistic view is that we are still searching for the best method or combination of methods for instruction in the comprehensive high school" (p. 31). He (1984) concludes by stating, "We must examine for ourselves (vocational educators) the purposes of education and the characteristics of an educated person, and from that create an appropriate role for vocational education in the comprehensive school" (p. 33).

In another reference to the general goals of high school education, Barlow (1986) writes:

> We have an obligation to help young people to attain a balanced social and emotional adjustment; to express their ideas; to protect their health; to become responsible informed citizens; to enjoy art, music, literature,and creative activity; to participate in family affairs; to direct their personal and social conducts; and to choose a vocation...Achieving any of the goals of general education is probably less a function of the subject matter than of the creative imagination of the teacher. (p. 15)

Barlow asks us to envision the general goals of education written on a blackboard and individual courses as transparent plastic screens set out in front of the blackboard. With this perspective, he notes:

> When we look at a subject matter area, we see in the background all the goals of education. Regardless of how we change the subject matter areas, we always see in the background the general goals of education. As we think about any subject matter area, we might determine with ease how some of the general goals of education might be achieved during the normal process of teaching the subject. (p. 15)

In Barlow's concept, the goals of secondary education are not completion of subject matter courses, but are skills, attitudes and knowledge that can be gained through a variety of subjects, including vocational education.

Increasingly, a commonly heard question is, "What do we intend to accomplish in vocational education and for whom?" This increased attention to the mission of vocational education is considered by Dyrenfurth (1985) to be "the most significant effort toward its improvement." He writes, "I find an increasing recognition that vocational education is a continuum of programs beginning with awareness and exploration of career and technological clusters, moving to a core of entry level preparation programs, and culminating in retraining and upgrading activities" (p. 45).

Parks and Henderson (1984) state that the mission of vocational education is "first and foremost (to) prepare people for employment." They indicate that vocational education is actually a combination of three goals: (a) job skills training, (b) career exploration, and (c) the development of employability skills. At the same time it should "strive to give students a capacity for continued learning," meaning that basic skills should be reinforced in vocational education (p. 38).

Vocational educators see that vocational education can attend to the needs of all students. Dyrenfurth observes, "They share a singular concern for all students entrusted to the school--not just the academically able, not just those with limited ability, not just the average, but all students" (1985, p. 43). He also shares his view of what it is that those in vocational education do best: "helping a wide range of clients meet awareness, exploratory, preparatory, placement, remedial, retraining and upgrading needs related to the world of work. . . We must refuse to be boxed in to mere occupation/job-specific training concepts of our mission" (p. 46).

In recognizing the need for schools to "serve students of all abilities and a whole spectrum of learning styles," vocational educators are understandably "apprehensive at seeing the school curriculum slanted so strongly toward traditional academics. . . What makes the single-mindedness of the reformers so worrisome . . . is their failure to recognize that diversity of need" (Dyrenfurth, 1985, p. 46).

Clarifying the Role of Vocational Education in the Secondary School

Even while mission statements for vocational education are being debated all over the country, vocational education goes on in the high school (more or less securely) serving some purposes, meeting some needs. What purposes are actually served and how is vocational education perceived?

The most common answer is that vocational education helps people develop job entry skills. The typical vocational curriculum is oriented to occupational skill training with the intent of aiding youth in securing and maintaining employment (Lotto, 1983). Some interpret vocational education in the secondary school as occupationally specific training while others consider it having a broader purpose which includes employability skills. Parks and Henderson (1984) define employability skills as including appreciation of the work ethic, task orientation, productivity, sense of responsibility, and employer allegiance. These job-entry skills are considered crucial since a large number of students enter the job market immediately after high school. Bishop reminds us that 63 percent of the labor force have no formal schooling beyond high school (1986, p. 93). Not all students want or are able to continue their formal education after high school (Parks & Henderson, 1984, p. 38). Even those who do continue their education beyond graduation can benefit from the vocational skills learned in high school as they work to support themselves while in school. In another way, interests developed in high school vocational education might be the basis upon which some students direct their further education (Pucel, 1984; Saul and Gull, 1985).

Copa (1984) states that vocational education in the secondary school is a "place to learn, a way to learn, and a reason to learn." It is a place to learn by providing a niche in the school where students with a common interest in work and family roles can come together to pursue their educational needs. Vocational education as a way to learn provides an alternative means to study most often involving more concrete situations and integrating body and mind. As a reason to learn, vocational education can provide the motivation and relevance to learning necessary content which under other circumstances would be very unappealing. As such, vocational education can equitably and effectively serve a wide diversity of students. Pucel (1984) agrees with some of these same perspectives on the role of vocational education in the high school curriculum because "it provides an alternative learning mode for the many students who cannot learn or do not want to learn through typical academic classes" (p. 44). He points out that it is not that vocational students cannot learn, but that they learn differently; that the method for learning used in vocational education is more consistent with the cognitive development of some students. Vocational education also makes academic subjects more relevant by the use of real objects and real problems. Mathematics, science and English are taught when they are needed to do practical tasks and the relevance of such knowledge is then appreciated. Some students, Pucel notes, helped by vocational education through a stage of cognitive development, become able to later learn abstractions more effectively.

Another common perception is that vocational education helps to prevent student "dropout" problems. Lotto (1983) concludes that vocational education helps avoid the liabilities of dropping out and gives salable skills, too. A report of the commission of the Future of the South (1986) notes that vocational programs "offer alternatives for those students tempted to drop out of school, yet they must not become havens for students escaping from trouble with reading or math" (p. 15).

One problem Eisen (1986) brings up is that vocational education in high school becomes viewed as alternative education in a negative sense, a second class education. He calls for a redefinition of purpose, saying that vocational education is "not a dropout program" and "not an alternate education for the non-college bound." Vocational education serves all students (p. 8). A 1984 National Gallup Poll cited in "The Unfinished Agenda" (1984, p. 8) reported that the general public (83 percent) believes vocational education should be required for those not planning to go to college. In addition, 37 percent feel that some vocational education should be required even for the college bound.

Barlow (1986) points out the critical role that vocational education serves in the lives of some students: "One fact stands out clearly--for some students the last opportunity they may have to achieve the general goals of education may be in the environment of the so-called 'vocational class'" (p. 15). He explains the misconception of the word general and vocational:

> Vocational . . . a difficult term for there are no vocational subjects. Nothing inherent in any subject makes it vocational in nature . . . it is rather the intent of the learner . . . not the nature of the subject (that makes it vocational). (p. 15)

While welding becomes a vocational subject in our minds, "the analogy works just as well for art, physics, history, Spanish or any other subject." A course becomes a 'vocational subject' only if students are assigned to that course according to their vocational intent (p. 15).

Barlow (1986) continues, "It would appear that vocation is reasonably important in the lives of all persons" (p. 16). Young people will spend at least 40 years of their lives in the work force. But our on-going philosophy of education seldom gets around to an appropriate implementation of vocation education. The school attends to other needs first and time runs out. "Vocational education is simply not getting a fair share of the school time or attention" (p. 16).

An extensive treatise on the purposes of vocational education in the secondary school was done by Copa, Daines, Ernst, Knight, Leske, Persico, Plihal, and Scholl (1985). After reading and discussing the major authors relating to the purposes of education, vocational education and its specific sub-fields, and future sociological changes, these authors described several reflections on the purposes of secondary vocational education. These reflections suggest that vocational education does and could contribute to the broad goals of education in two primary ways: (a) an emphasis on the use of skills and learnings developed in other areas of the school curriculum to concrete situations, and (b) a joining with other educators to help students develop and practice reasoning skills. The unique purposes of vocational education in the secondary school were thought to be (a) helping students seriously consider what they want their life to be like--how work itself and interpersonal relations in the workplace and in the family can contribute to an integrated and meaningful sense of self and community, (b) increasing rather than decreasing occupational opportunities for students, and (c) nurturing students' pride in and enjoyment of work by helping them develop technique and an appreciation of technique as useful in work.

In an interpretive follow-up study of the practice of vocational education in a sample of secondary schools in Minnesota (Copa, Plihal, Scholl, Ernst, Rehm, & Copa, 1985; Plihal & Copa, 1986), thirteen purposes were identified for secondary vocational education. Nine of the purposes related to the needs of students and included (a) building a feeling of self-competence, (b) applying the basic skills learned in other courses and applying to other courses what was learned in vocational education, (c) thinking through problem situations, (d) learning technical skills, (e) exploring life roles involving work and family responsibilities, (f) learning to work together, (g) expressing self through learning, (h) extending self to community, and (i) going "on-stage" with selected life roles. Four additional purposes identified for vocational education related to the context or needs of the school. These included: (a) providing a change of pace at school from other courses, (b) providing an appropriate education for some, (c) giving meaning to school, and (d) considering fairness in school. The conclusions drawn were that vocational education has many and diverse purposes, often the purposes of vocational education remain implicit, and the purposes overlap and interact.

In a next step looking to the future visions of vocational education in secondary schools (Copa, Plihal, & Johnson, 1986), five well-known educational writers envision what vocational education should be like in the future as drawn from assumptions and information they believed to be sound. The revisions varied widely from emphasis on specific skill training to major restructuring of vocational education drawing on the content of academic disciplines. Analysis of the papers and their discussion at a symposium resulted in the following observations: (a) there is an urgent need to make a clear statement about the purpose of vocational education in secondary schools to guide policy makers, administrators, and practitioners; (b) the meaning of vocational education needs to be clarified in terms of who is of highest priority to be served, being clear about underlying values, resolving the importance of specific job training, and listening to the viewpoint of those outside vocational education; (c) consideration should be given to restructuring vocational education in secondary schools so as to shift to bottom-up decision making, building flexibility into the system, relating vocational education to the rest of education, and increasing access by all students.

Reforming Education--Effects on Vocational Education

The reforms that are sweeping the nation's schools are not by federal order but the results are nearly the same. The changes made in reaction to national reports about deficiencies in schools have been similar across the country: increased high school graduation requirements along with increased college entrance requirements in mathematics, science, world languages, and social studies.

Some wonder how requiring more academic courses will improve the basic skills of students already discouraged enough to drop out. Only rarely has vocational education been placed on the list of required courses. Dyrenfurth (1985) reported only five states with this policy as of 1984-85. He notes the following about the effects of the reform on education in general and on vocational education:

> Although well intentioned and driven by appropriate concerns, the wave of educational reform is jeopardizing vocational education's contribution to the high school curriculum. It is as if America's decision makers have forgotten that one of the cardinal purposes of schooling is to prepare people for productive work roles. (p. 43)

Besides increased course requirements, Dyrenfurth notes that there is also a disturbing trend toward separate requirements for an advanced or college-preparatory diploma. He found that twenty-seven states had adopted or were considering a second type of diploma:

> Given the power of credentialing in America, one has to wonder whether the supercredentials will result in added value ascribed to students holding them, or devaluing of graduates without them. (p. 44)

With regard to vocational education, Dyrenfurth, in his national survey of vocational directors, found a narrowed opportunity for students to take vocational education in nearly every state. Reduced vocational education enrollment, reduced vocation education time blocks, less exploratory courses, and vocational education programs being cut have been common responses. Many secondary area vocational education centers face severe enrollment pressures.

Besides the national education reports and the pressure to increase basic skills proficiency, Parks and Henderson (1984) cite declining enrollments and anxiety about the impact of high technology as additional catalysts for changes in vocational education. The changes experienced in Ohio's vocational education include: delivery, curriculum, staffing, funding, accountability, and questioning of the central mission of vocational education in the secondary school. Similar changes have occurred in many other states (Brown, 1984; Dyrenfurth, 1985; Saul & Gull, 1986).

Clarification of the mission of vocational education is seen as a positive effect of the reform movement. Dyrenfurth (1985) notes this "self-scrutiny" is evidenced in new mechanisms for planning, accountability, administration, a rethinking of vocational education's objectives, strengthened subject identity, revised curricula with more emphasis on entrepreneurship, and more use of competency-based instruction. Other positive effects have been:

1. Increased communication with public groups such as advisory councils and business and industry partnerships.

2. Strengthened links with mathematics and science instruction and attention to the use of vocational education courses to meet graduation requirements.

3. Decreased emphasis on occupation-specific secondary vocational education in favor of more exploratory approaches, such as New York's requirement of one unit of technology for all secondary students.

To avoid being "eased out of the educational scene," vocational educators in Virginia and several other states have tried to find time for vocational education (Brown, 1984, p. 35). A variety of approaches have been taken to verify the value of vocational education in the secondary school and to increase the public's understanding of its goals and objectives. The dilemma to policy-makers according to Lotto (1983) is how to encourage maximum achievement in basic skill areas for all students, yet provide education and training experiences for all.

Defining the Meaning of the Basics

The word basics holds different meanings for different authors. Looked at in an historical way, the basics are the communication and computation skills considered basic to "successful participation in adult society" (Lotto, 1983) or basic to all other educational pursuits. These include reading, writing, speaking, listening, and adding, subtracting, multiplying and dividing.

Another meaning refers to content taught in courses with traditional titles which many people see as basic to a general education, not necessarily basic to all other learning. This definition of basics would include mathematics, science, English, and social studies course content. During the current "back to the basics" movement, it seems most are interpreting the word to mean "traditional subject matter" or "academics."

Some speak of basics as life skills, the knowledge and skills needed for living in the adult world. This definition includes such topics as nutrition, health, and family relationships. John Goodlad's (1985) definition of basics in education is not bound by course titles but categorizes knowledge into four spheres of human development: intellectual, social, vocational and personal. Each of these four basics needs to be developed in all school children.

The National Science Board Commission of Pre-College Education in Mathematics, Science, and Technology (1985) declared in its report, Educating Americans for the 21st Century:

> We must return to basics, but the basics of the 21st century are not only reading, writing, and arithmetic. They include communication and higher problem-solving skills, and scientific and technological literacy--the thinking tools that allow us to understand the technological world around us. . .Development of students' capacities for problem-solving and critical thinking in all areas of learning is presented as a fundamental goal. (Cited in Costa, 1985, p. 3)

Additional support for this view resulted from the work of a national committee of leaders from various organizations and industries directed by the Education Commission of the States in 1982 to identify those skills that would be considered basic for the future. They listed "Evaluation and analysis skills, critical thinking, problem-solving strategies, organization and reference skills, synthesis, application, creativity, decision-making given incomplete information, and communication skills through a variety of modes" (Cited in Costa, 1985, p. 3-4).

There are probably other ways of perceiving the basics. The literature uses various forms and combinations, making it difficult to locate and sort out those relevant to this study.

Strengthening the Basics Through Vocational Education

Bishop (1986), Eisen (1986), Halprin (1984), Lotto (1983) and Parks & Henderson (1984) all write about the need for basic skills in order to be successful in vocational training, obtaining initial employment, productivity on the job, advancement in the labor market, and later retraining. They use the term basics to refer to communication, computation, and study skills and make the point that vocational education students score lower in standardized achievement tests than do college-bound students (Bishop, 1986; Lotto, 1983).

Eisen (1986) reminds us that too many vocational students have graduated without sufficient knowledge of the basics although they can perform specific job tasks. Yet, if one of the goals of public schooling is to educate students in the basic skill areas, Bishop (1986) notes, "Ways must be found for students not planning to enter college to get a solid grounding in basic skills and the rigorous math and science courses" (p. 102).

Tracking, or stratified curriculum, as Lotto (1983) calls it, has brought to light a great difference in the basic skills proficiencies of vocational students compared to nonvocational students. The concern is that students may be forced to choose between obtaining basic skills and obtaining vocational education. Lotto goes on to suggest that depending on one's perspective, this happening could be viewed as either an educational and social asset or as unacceptable in a democratic society:

> If the stratified curriculum is viewed . . . as a means to encourage, motivate, and fulfill the academically less able student, then these findings are neither surprising or troublesome. But if one sees curricular stratification as a means of perpetuating social and economic stratification and inequity, then these findings . . . indicate that certain pupils are systematically denied access to the means of acquiring social power and prestige. (p. 10)

Access to vocational education has been decreasing with overall enrollment declines and with the trends to increase graduation requirements in other than vocational education areas. Dyrenfurth found a narrowed opportunity for students to take vocational education in nearly every state. He found reduced vocational enrollments, reduced vocational time blocks, less exploratory courses and vocational programs being cut as common responses to calls for the reform of secondary education (1985, p. 44). With tighter class schedules and less vocational offerings, many students may graduate with perhaps higher standardized test scores, yet seeking work and family roles without vocational skills.

Many other students simply do not stay in school long enough to graduate, giving up both the basic and the vocational skills. Saul & Gull (1985) reported a 31.1 percent drop-out rate in 1982 for California schools and Perlez (1987) reported a drop-out rate as high as 54 percent in 1986 for New York City, for students beginning ninth grade but not completing twelfth. The Policy Analysis for California Education Project reports that "The most common reasons California students give for dropping out include poor grades, a feeling that "school was not for me," pregnancy, and choosing to work" (cited in Saul & Gull, 1984, p. 4).

The excellence movement and its emphasis on academic rigor raises concerns about even greater disenchantment and drop-out rates and an accompanying need for eventual remediation. The report, Improving Basic Skills: An Administrator's Guide (Lotto, 1983), addresses this question, as have several states and local districts, stating that all vocational students would have access if basic skills were integrated into vocational programs.

Changing High School Graduation Requirements and Vocational Education

Courses required for graduation rarely include vocational education, sustaining the assumption that graduation requirements and vocational education are mutually exclusive. However, Barlow (1986) bemoans the sharp division in our schools, quoting Theodore Greene, who in 1955 said,

> It is an everlasting pity that so sharp a dichotomy has established itself in our minds between liberal education and vocational training, with the false implication that the former is somehow high, though useless and the latter useful, but somehow crass and demeaning. (Cited in Barlow, 1986, p. 16)

In their paper entitled, "Strengthening Academic Foundations of Vocational Education Programs," Parks and Henderson (1985) give two interpretations of provisions in the Carl Perkins Act which "encourage strengthening academic foundations of vocational education programs" (p. 43). The liberal view is that we should teach mathematics and science via practical application. A broader, global interpretation is that "academic and vocational coursework ought to be a fused, coordinated curriculum for all students" (p. 43). Parks and Henderson go on to explain that the provisions support "'many educators' long held belief that the mutually exclusive approach to curriculum is no longer applicable" (p. 43). Parks and Henderson note that business and industry did not request more academics, but applied academics, and that those requests are often misinterpreted.

The National Commission on Secondary Vocational Education (1984) in their report, The Unfinished Agenda, also recommended a more complementary relationship between vocational education and the basics:

> Secondary vocational education courses should provide instruction and practice in the basic skills of reading, writing, arithmetic, speaking, listening and problem solving. (p. 25)

The 1986 report of the California Advisory Council on Vocational Education promotes awareness of the "alternative means of instruction" provision of California State law. The law encourages educational options in noting that all students need a choice of coursework that will provide an opportunity to prepare for employment and provide academic excellence. Bishop (1986) agrees that occupational and basic skills are complementary to each other, but not substitutes. He suggests that while occupational skills lead directly to greater worker productivity, basic skills help learners learn new tasks more quickly. All workers need both. Halprin (1984) is also supportive of this perspective in writing that effective school research advocates the cross-subject teaching of basic skills. For example, vocational education should impart skills necessary for career success, both thinking skills and performing skills.

Pucel (1984) explains that in vocational classrooms mathematics, science and English are not taught in an artificial environment; they are taught when needed to do practical tasks. Abstractions are taught through interaction with ideas in tangible, useful ways. His interpretation differs from Halprin, however:

> This is not to say that all math, science and so on should be taught through vocational education courses; that would be far too inefficient, vocational education also has other goals. But vocational education can be useful as a supplement to teaching some of the core curriculum skills and as a vehicle to teach more advanced concepts that are relevant to selected occupations. (p. 44)

Barlow (1986), as cited earlier, states that all courses should be able to further the general goals of education; that a general education is not limited to or defined by specific courses. Parks and Henderson (1985) review some of the benefits of a complementary relationship between vocational and nonvocational courses:

1. As noted in The Unfinished Agenda, vocational education is frequently the "catalyst that reawakens" student interest in school and "sparks renewed interest in academics."

2. It can assist students in lifelong learning skills. Academics are fundamental to occupational programs and to learn how to learn, which is important to future job changes.

3. It can broaden non-vocational students' opportunities to see theories put into practice. Vocational education can satisfy the need in education to be more applied, concrete and related to the real world.

4. The public may perceive vocational education in a more positive light when it understands that vocational programs encompass the principles of math, science and communications. (pp. 44-45)

In summary, questions posed by Lotto (1983), appear significant:

> What type of curriculum is most appropriate and beneficial to noncollege bound students? What content mix will provide a maximum preparation in basic skill areas, occupational skill areas, social, and citizenship areas? And, can this be achieved within the present curricular structure of the comprehensive high school? (pp. 26-27)

Vocational Education and High School Graduation Requirements

The requirement for graduation at one time in this country was a student's ability to successfully pass examinations in specific areas of skills and knowledge. The content of the examination was largely determined by school superintendents. As education has evolved, the requirements for graduation have shifted from content to course completion or credit hours based on course areas. There has been much criticism of the present system which emphasized "seat time" and largely ignores competence in knowledge or skills. Recent attention to this lack of competence has led to the excellence in education movement and, ironically, to yet another increase in required "seat time" (Serow, 1986). Competence is not commonly described in graduation requirements; courses in specified areas are. Traditionally academic, these lists rarely include vocational education even though the goals of educational institutions usually include preparation for work and family roles (Goodlad, 1985).

Many object to the present system of requiring seat time in particular course areas. Barlow (1986) writes about the unfortunate situation in education which "creates the false opinion that one can get educational value merely by choosing a certain subject" (p. 15). Numerous rules making students elect courses from certain subject areas of instruction more explicitly emphasize general objectives of education; their courses are general education courses. But, as previously noted, Barlow (1986) disagrees, noting "general education is not subject matter." He proposes that all courses should realize general objectives of education, including vocational education (p. 15).

Parks and Henderson (1984) also believe that quality in education is not solely the purview of 'academia,' nor is quality directly proportionate to the amount of education that students receive. They say that "quality education is determined by the degree to which students set and meet 'worthy educational goals,' in concert with personal and societal needs" (p. 38). And Bishop (1986) writes, "The key determinant of learning (as measured by testing) is the rigor of the courses taken, not the total number of academic courses or the total number of hours spent in a school building during a year" (p. 99).

There are those who envision a "marriage" of the two areas of academic and vocational education, including content and teaching styles, and a change in the single-minded approach to determining which courses meet graduation requirements. They favor credit for "applied academics." For example, Eisen (1976) explains, "Vocational education and basic academics should not be viewed as competitive or alternative learning, but as complementary learning...There are many opportunities, particularly for the non-college bound youngster, to obtain basic academic skills in an applied manner through vocational education" (p. 9). If academic competencies are adequately addressed in vocational courses, he writes, "provisions should then be made for students who successfully complete the course to be awarded the appropriate academic credit toward meeting graduation requirements" (p. 9).

Some have suggested other kinds of graduation requirements altogether. Cited in the "Summary of Major Reports on Education" (1983), Goodlad suggests that a core (required) curriculum should not consist of common courses, but of a common set of concepts, principles, skills and ways of knowing. He says that parents want the school's program of study to provide balanced attention to intellectual, social, vocational, and personal facets of learning. From another perspective, the Paideia Proposal (also cited in this summary) recommends a common course of study based on three types of learning and teaching: acquisition of organized knowledge through didactic instruction, development of intellectual skills through coaching, and understanding of ideas of value through Socratic questioning and active participation. These three parts do not correspond to separate courses; rather, quality instruction in all classes involves all three types of learning. Perspective such as illustrated by the two above views would lend new ways to think about and prescribe graduation requirements.

Vocational Education Courses Meeting Graduation Requirements

Vocational courses do not hold a prominent position in most state lists of high school graduation requirements. When they are mentioned, it is in one of the following ways:

1. Vocational courses may earn elective credit toward graduation. This is the most common arrangement (Dyrenfurth, 1985).

2. Vocational education is required for graduation. According to Frantz, et al. (1986), vocational education is required at some level in 15 states.

3. Vocational education is listed among several options for meeting a part of the state requirements for graduation. This is the case in 13 states (Dyrenfurth, 1986). An example is

the California provision for "alternative instruction" (Saul & Gull, 1985).

4. Specific vocational education courses or programs are listed as alternatives, equivalencies, substitutes, or options for specific graduation required courses. For example, Virginia lists specific vocational education programs approved as substitutions for other courses at the state level (Brown, 1984).

Frantz, et al. (1986) found in a nation-wide survey of graduation requirements and vocational education enrollment patterns, that in 15 states vocational education was part of the requirements for graduation. They also reported that in 28 states vocational education courses had been approved (at either the state or local level) as appropriate alternatives for mathematics, science, and English requirements. The survey did not distinguish between state or local requirements being met by vocational education courses, so the number of states (28) may be very high if meeting state requirements is under consideration.

There is great variation in the specific vocational education courses allowed to fulfill graduation requirements. Where course content and/or approval is regulated at the state level, more uniformity might be expected. However, local districts usually have the option of accepting or rejecting the state-approved courses. Local districts also often impose additional graduation requirements and decide which courses meet those local requirements. Therefore, local requirements and acceptable courses for meeting them may be either more or less restrictive than state required and approved courses.

Some states (e.g., California, Minnesota, Washington) list requirements as course areas and do not mention which specific courses meet those requirements. It then is left to local districts to interpret the intent of the stated requirement and to determine which courses are either acceptable or not. A great variety of interpretations is both expected and accepted.

The literature does not neatly outline all of the possible vocational education courses or programs involved in meeting graduation requirements. Some of the more common arrangements, found mainly in the report by Saul and Gull (1985) in California are as follows:

These courses:	Meet the requirements for:
Agriculture, health occupations and human development	Life science

Business communications, court reporting, and word processing	English
Auto mechanics, machine trades	Physical science
Carpentry, business mathematics, drafting, food service, and consumer mathematics	Mathematics
Family life	Social studies

Questions in Deciding if Vocational Educational Will Meet Graduation Requirements

From a review of the related literature and conversations with knowledgeable persons in several states, several questions are commonly asked in considering whether or not to allow vocational education courses to meet graduation requirements.

Who Will Teach It?

Who is qualified to teach the course content which meets graduation requirements? The question can be a very sensitive one and the answer might depend on the extent of state regulations regarding licensure and credit (Parks and Henderson, 1985). The following examples illustrate some of the variation in existing regulations. In some areas, the general education certificate by teachers is enough to satisfy the question of qualifications. A local school board, for instance, might approve of a generally certified vocational education teacher to teach the basic content (within vocational education courses) to meet graduation requirements. In other places, regulations specifically state that credit will be granted only for courses taught by teachers licensed in specific course areas. For example, science credit may only be granted if the teacher is licensed as a "science teacher." And yet other states rule that teachers may only be allowed to teach courses in areas for which they are licensed to teach, but not mentioning if these courses are allowed to provide credit toward graduation requirements.

Beyond certification, there may still be some question of vocational teachers' ability to teach the required content. The concern that teachers who meet licensure regulations might still be deficient in writing and computation skills has brought some opposition to vocational education being used to meet graduation requirements. It is not necessarily the integration of content, but the abilities and knowledge of vocational education teachers that is being questioned (The National Center for Research in Vocational Education, 1986).

There is also the possibility that vocational teachers may look at the "failure" of other areas of education to give some students the basic skills for graduation and say, "It's not my responsibility" (Bishop, 1986). This reluctance on the part of faculty to get involved in teaching basic skills is also discussed in the report, Improving the Basic Skills (1986, p. 72-73).

Changing a part of the high school curriculum also often raises concerns about the student enrollment shifting because of the change. The underlying concern here is the teachers' job security. Teachers who envision lay-offs in their departments as a result of enrollment shifts may resist the plans or they may insist that they be the ones to teach specific components based on their licensure, or on state requirements for credit-granting (Saul & Gull, 1985).

Deciding who teaches the basic skills portion of a vocational course includes considerations such as: teachers' qualifications in relation to regulations and content area, teachers' attitudes, teachers' concerns for job security, and the extent of the graduation-required content to be included in the vocational course.

Is It Worthy of Credit?

When vocational courses are to earn credit toward graduation requirements, criteria for course approval will likely be based on credit-earning capacity. Regulations about teacher license and about time-on-task for earning the sought-after credit hours toward graduation requirements are important.

One approach to deciding this question is to find out if the course covers enough "basic" content to warrant credit. The documentation process varies. Some study time spent within vocational education courses on various topics, and then assign credit to those courses containing a minimum number of hours on, for example, mathematics or science content. Others review the vocational course outlines and texts to determine the level and breadth of basic skills instruction included in the courses and perhaps compare them to similar levels in graduation-required courses. Credit might be granted if sufficient content review and application are included (Brown, 1984; Saul & Gull, 1985). A third method involves a competency match. Competencies (or perhaps course goals) from vocational and graduation-required courses are compared and, if needed, some are added to the vocational education courses to match required courses. The judgment about whether the course offers enough "basic" content is made in some cases by an interdisciplinary team of teachers and administrators, and in others, by vocational education personnel alone (Brown, 1984; Saul & Gull, 1985).

Is Applied Academic Content Valued Sufficiently to Earn Credit?

There may be a "status barrier" to overcome in getting approval for vocational education courses earning credit. Although it is often said that "pure academics" ought to include more application, be more closely related to the real world (Parks & Henderson, 1985), many still believe that all students need the more theoretical content in school and will somehow get the application experience outside of school. While some are beginning to accept the time-on-task documentation or competency matches, others hold to the idea that credit is only meant for "pure" science, mathematics, and English. The California report cited earlier points out that the opinion of some school board members is that vocational courses are "watered down" academic education. "The assumption seems to be that students need more academics without regard to nontraditional means of achieving that academic proficiency" (Saul & Gull, 1985, p. 11). Thus, courses teaching application of principles are often less valued. The idea that some vocational courses could receive credit is either disregarded altogether or a "waiver" of a graduation requirement might be given, rather than granting credit straightforwardly for vocational education.

Thus, the question of "worthiness" is still being debated. Those who believe that a vocational course is not worthy claim they are trying to keep up the standards of secondary education for all students. Those who feel that it is, are tackling the burden of proof by documenting the in-class coverage of theories and principles usually thought to be the purview of traditional academic areas. And still others question the standards against which vocational education is judged altogether.

What Are the Risks?

Cost is always a concern when making changes. The cost of such arrangements depend on the extent of changes made, and on the regulations of the state. Some cost will likely be incurred during both the planning and implementation stages. Time and money costs include the following:

1. It takes time to identify the basic concepts which are already present in a course or are to be added. The amount of time and energy varies according to the method used. Input is desirable from vocational and other teachers, administrators, and perhaps business and industry personnel (Parks & Henderson, 1985; National Center for Research in Vocational Education, 1986).

2. Scheduling options must be analyzed by teachers and administrators to ensure adequate time in which the new arrangement will fit. Traditional amounts of time allocated to vocational education in a state may become a factor (Parks

& Henderson, 1985; National Center for Research in Vocational Education, 1986).

3. If teachers are being asked to make major changes, conferences and workshops for curriculum development and teacher and administrator in-service programs may be necessary. Such training can help by increasing the appreciation of the academic foundations in the vocational education setting (Parks & Henderson, 1985; National Center for Research in Vocational Education, 1986). A prerequisite for licensure might also need to be added or teachers might be encouraged to pursue necessary certification requirements (Lotto, 1983; and Parks & Henderson, 1985).

4. Teachers also will need to be granted additional time to plan, implement and monitor the changes made in classrooms. Achievement in basic skills and/or academic content must be emphasized as a curricular objective and communicated to all (Parks & Henderson, 1985).

5. Classroom materials may need to be revised, newly developed, or purchased to meet the appropriate levels and types of instruction needed. These new or revised materials will also cost time and/or money (Lotto, 1983; National Center for Research in Vocational Education, 1986).

6. Improvements or additions in facilities or equipment might also be desired (National Center for Research in Vocational Education, 1986). However, adding more basic skills components to vocational education will usually not require additional facilities and equipment.

Sources of funds play a large part in deciding what courses will be involved and who will teach them. In states where funding is based on student enrollment in vocational programs, these arrangements might raise the question, "Which department will receive funds for the course?" The funding system could act as a constraint on creative arrangements intended to bring about the most effective learning of basic skills and their applications.

There are scarce federal funds for increasing the academic foundations in vocational education, yet Parks and Henderson (1985) note that careful investment based on individual state needs could yield high dividends. They suggest that competitive grants using federal funds be used as "seed money" for pilot projects, exemplary program building and awareness conferences. Planning workshops and in-service programs are considered worth the cost to strengthen vocational education's academic foundations.

Is It Practical?

In addition to time and money considerations, students' characteristics must be taken into account in implementing any major changes. In the report, Improving Basic Skills, the National Center for Research in Vocational Education (1986) points out that the skill level of students taking the class, the size of the group, and the intensity of their interest will likely affect the direction and depth of the course involved. The report's discussion leads one to ask, "To what extent should the content and materials be geared to basic skill level?" as the report suggests doing. If one objective is to reinforce basic skills or to teach application of academic fundamentals, teachers would need to resist the urge to gloss over basic skills considered beyond the students' capability.

The commitment to recognize and/or increase the academic content in vocational education, as discussed by Parks and Henderson (1986), requires some changes in attitudes, values, procedures and practices by teachers. Although more difficult to measure, these very important aspects should be considered in the planning and implementation states of the proposed arrangement. The working relationships between staff of several departments within the high school must be nurtured for the success of the program. A major consideration is the willingness of people to work together in setting up and maintaining the new arrangement over time. Open communication and on-going coordination are essential.

Approaches Used to Arrange for Credit Toward Graduation Requirements Through Vocational Education

Find and Document It

The "find it and document it" approach assumes that a substantial amount of graduation-required principles or theories are already being covered in the vocational education classroom. A review of the course outlines or competencies uncovers and documents the basic skills and knowledge being taught and/or reinforced. In some cases, the review is done by the vocational teacher alone while, in others, a team of two or more (including a teacher from mathematics, science, English, or social studies) take on the review process. By counting time spent on a knowledge area or the number of knowledge areas and skills covered, and comparing them to that in similar level "standard" courses, a decision is made about granting credit toward graduation requirements. If sufficient content already exists, the course will not be altered; but the committee might recommend certain components be added or expanded to meet minimum standards for credit. This was the approach taken by the Virginia Department of Education as described by Brown (1984). "Each program prepared a summary of the applications of math and science in the curriculum of their service areas" (p. 35). There are also several examples of this approach in the report assembled by the California Advisory Council on Vocational Education (Saul & Gull, 1985).

Integrate Theory and Application

A second approach could be called "integrated" since the underlying theory or principles are taught within the vocational course using application as the route for leaning. As described by Parks and Henderson (1985) this approach means that the vocational instructor "removes slack time" from the vocational curriculum or makes room for added academic emphasis. Typically, it seems, the vocational teacher teaches all parts of the course, but may consult with other teachers for background information and teaching materials as needed.

Coordinate Separate Classes

A combined approach involves lessons being taught separately in vocational education and other courses, but coordinated (Parks & Henderson, 1985). The arrangement is similar to a lecture and laboratory where the principles are covered in lecture and then reinforced through application in shop experiments and projects. Halprin (1984) describes applied science in Toms River, New Jersey in this way. The underlying principles may be taught by the vocational teacher or there may be some degree of team effort, with both vocational and academic teachers dividing the course. The teachers cooperate on planning, goal setting, curriculum development, teaching, and evaluation. In the report entitled, Improving Basic Skills, the National Center for Research in Vocational Education (1986) highlights the benefits of such an approach:

> Cooperative relationships help insure that instructional goals are valid and relevant to the academic discipline and to the occupational program, that teaching strategies are appropriate for the students, that valid content and sound strategies are used, and that objective evaluation takes place. (p. 37)

Parks and Henderson (1985) stress the importance of coordination as well. This approach can satisfy the restrictions on credit-granting in states where regulations about teacher licensure and credit are very explicit.

Another version of the coordinated approach being tried is where academic courses are incorporating vocational and technical content and terminology. Teachers must learn vocational materials and goals in order to plan learning activities which will lead to vocational application of basic skills. An example would be using real occupational mathematics problems to ensure that the instruction is relevant and to capitalize on the motivational value of vocational programs (National Center for Research in Vocational Education, 1986).

In both the integrated and combined forms, the actual course content may follow from a study of the basic skills and knowledge needed in specific occupational areas or it may follow the guidelines for basic content which a school must provide in order to grant credit toward graduation (see Saul & Gull, 1985 and Halprin, 1984 for examples). The refinement and coordination of theory and their application are essential and this comes back to the importance of teachers' willingness to work together. "It's a matter of willingness to do, not how or what to do" (Parks & Henderson, 1985). Open communication and coordination must be carried on throughout the years, not just when the program is first implemented.

The report, Improving Basic Skills (National Center for Research in Vocational Education, 1986), states that the combined approach has the greatest potential for success since elements can be combined in different ways to suit the needs of individual schools or districts. It allows for differences in resources, goals, priorities, and limitations. This report also emphasized that administrators need to encourage interdisciplinary support among teachers.

Halprin (1984) recommends a more integrated approach. She feels that there are important benefits to training the vocational education teacher to teach needed skills as part of their normal lessons:

1. Students learn in their normal classroom setting and do not feel the separation or curriculum fragmentation.

2. If this process is part of the curriculum format, teachers will better understand that they have a responsibility to teach basic skills.

3. Students have the opportunity for immediate laboratory reinforcement.

This approach would entail curriculum revision such as denoting specific basic skills needed for each performance task and some additional teacher training, but would be worth the effort in the long run, she notes. Halprin labels the content to be stressed, "content area basic skills."

Describing the Relationship

At first glance, the great variety of terms used to describe the arrangements for vocational education requirements can be rather confusing. Therefore, exploring the use of terms and the meanings implied is worthwhile. The literature reviewed contains the following words: substitutions, program options, equivalency credit, applied credit, and alternatives. The words carry various meanings and perhaps hint at the motivations for the arrangements. Webster's Ninth Collegiate Dictionary (1983) defines the terms:

Substitution -- a thing that takes place of another; a replacement.

Option -- something that may be chosen; an alternative course of action; an item that is offered in addition to or in place of standard equipment.

Equivalent -- equal in force, amount or value; corresponding or virtually identical in effect or function.

Alternative -- a situation offering a choice between two or more things only one of which may be chosen; one of two or more courses, propositions, or things to be chosen instead; or as in "alternative school" meaning school with a non-traditional curriculum. Synonym is "choice."

Applied -- the use of general principles to solve definite problems; put to practical use.

"Option" and "alternative" convey the idea of choice. The choice may be made between equal things or it may mean the choice of something in the place of the standard or traditional. The "substitution," replacing something which is considered standard, conveys the idea that the substitute fills in for, but is not necessarily as valuable. "Equivalent" on the other hand, would imply things being equally valued or having identical effects. "Applied" doesn't refer to a relative value between choices, but only to practical use (function). Applied describes a functional relationship.

Barriers or Facilitators to the Relationship

As with any proposed change, one needs to know the attitudes of those who will ultimately approve (or reject) the arrangement, and work to gain their support. Beyond the classroom, administrators play a vital role in the direction and outcome of the proposed arrangement. According to Parks & Henderson (1985), successful arrangements require that state and local administrators demonstrate "interest, concern, inquiry, leadership, and follow-through." Also, they must be willing to grant teachers the time to plan, implement and monitor change (p. 51).

At the earliest states of consideration, Brown (1984) writes that districts should "involve occupational advisory committees in identifying the qualifying options" (p. 36). Such committees might include parents, community members and employers to get a broad perspective of the issues involved (National Center for Research in Vocational Education, 1986). In addition, guidance counselors, because of their important role in students' class choice, can be critical influencers in the implementation stage and therefore should be brought into discussions early, and be well-briefed on the status and credit-earning potential of approved vocational courses (Brown, 1984, p. 36).

The California report by Saul and Gull (1985) describes districts where the attitude of the public and the school board was so conservative that opportunities for "alternative means of instruction" were very limited. In fact, it states, "Resistance by local school boards to let students take nonacademic courses for academic credit is the biggest barrier encountered by districts . . . Some boards view vocational courses as 'watered down' education" (p. 11). In addition, the competitive atmosphere between vocational and academic departments seems to be a very important factor. Even teachers willing to work together, then, would need to be concerned about the attitude of others in their respective departments. The report, Improving Basic Skills (National Center for Research in Vocational Education, 1986), stresses the importance of managing the efforts of various groups and individuals involved. "Your role as coordinator is likely to be much easier if you have cultivated a sense of cooperation among participants through the planning process. . . Alliances among departments are apt to be stronger when each has heard the views of the others in shared decision-making sessions" (p. 49).

Approval Processes for the Relationship

According to the literature reviewed and telephone interviews with personnel in several states, approval varies at both local and state levels. States seem to take four different approaches to the approval process:

1. Some states review vocational courses and programs and make a list of those approved to meet state requirements. Local districts may accept or reject the options (e.g., New York, Virginia).

2. Some states consider such arrangements as exceptions to the standard courses meeting requirements and so require individual districts to submit proposals to the state for exemplary or experimental status. Approvals for vocational

courses meeting state mandated requirements are made on an individual district basis (e.g., Texas).

3. Some states have provisions written into their state graduation requirements which allow "alternative means of instruction" for academic credit based on approval at the local level. State requirements, therefore, can be met by locally approved vocational courses (e.g., California, Washington).

4. Still other states do not address the issue of vocational courses being used to meet state graduation requirements. All such arrangements are initiated and approved within local districts, and then only to meet local, not state requirements (e.g., Minnesota, Alabama).

Consequences of the Relationship

A brief summary of the consequences of some programs found in the literature where vocational education receives credit toward graduation requirements follows.

California

Granting academic credit for vocational education in eight schools or centers in California has brought about these results in vocational education (Saul and Gull, 1985):

1. New competencies, course outlines, and textbooks are being used.

2. Vocational and academic teachers worked together on criteria for vocational courses that would satisfy academic requirements. The vocational content was "carefully scrutinized."

3. Academic educators now better understand the current vocational course content and they are more supportive of this option for students.

4. Vocational education is viewed as more than "work training."

5. Students are able to learn both basic and vocational skills.

6. Increased test scores are expected.

New Jersey

Halprin reports on efforts to incorporate basic skills into the vocational programs in Toms River, New Jersey, as follows:

1. Vocational teachers have become more aware of students' basic skill problems and can refer them for diagnosis or remedial instruction.

2. Vocational teachers are given suggestions on how to help students with particular problems with basic skills.

3. Vocationally-oriented materials have been provided for home-school classes to increase interest and relevancy.

4. Besides reinforcing basic skills through vocational education, there has been an increase in credibility for vocational education with the sending schools.

Oregon

In the survey by Frantz, et al. (1986), Oregon reported an increase in vocational enrollment to be partly due to the option of using vocational courses to meet graduation requirements. The other reason cited was that they have vocational courses in the comprehensive high schools rather than in the vocational center.

Ohio

In 1983, eight pilot projects relating vocational education and academic courses in secondary schools brought sufficient positive responses to the following criteria that the state approved extended cycles for all of them. The criteria were as follows:

1. Relates to a specific occupational activity

2. Reinforces basic skills, supports occupation and employability needs, and establishes a basis for training and retraining throughout the student's life

3. Complements the recently modified state standards

4. Enhances cross-over opportunities for college-bound students

5. Is cost effective

These vocational education projects experimented with changes in method, curriculum, and staff in projects ranging from concentration on basic mathematics skill proficiency, to content and delivery of curriculum modifications, to increased schedule flexibility. All were based on occupation-specific content and design, reinforced basic skills, and included non-laboratory instruction in mathematics, science, or communications. Parks and Henderson (1985) report improved test scores, increased student and teacher motivation, and increased student confidence and enthusiasm.

Methods of Studying the Relationship

Several methods of data collection were used in studies focusing on the relationship of vocational education and high school graduation requirements. The following studies illustrate three methods found to be used in the studies examined in the review of literature.

Literature Review and Analysis

Building Basic Skills: Results from Vocational Education is based on a literature review and analysis by Lotto (1986) in which he conducted a secondary source study reviewing existing reports and articles including (a) large data files, (b) compendia of research and programs in vocational education, and (c) citations in existing reviews in order to draw a picture of what is known about the relation of basic skills to employability and job performance. The findings and conclusions of these studies were analyzed for relationships, causality, processes, and outcomes. The degree of support for generalization from the studies was also assessed (pp. 1-2).

Survey

A Report on High School Graduation Requirements and Enrollment Patterns in High School Vocational Programs in the U.S. by Frantz, Strickland and Elson (1986) employed a national survey of states and territories regarding graduation requirements and enrollment trends. The brief survey form was sent to all state vocational directors asking about their estimates of general trends. Nine states stood out, showing decreased high school enrollments, but increased vocational enrollments. The vocational directors in those states were then interviewed by telephone to get their explanations for the unusual trends. The major factors elicited are discussed in the report. Only one state, Oregon, listed the vocational option for mathematics and science credit as a reason for increased vocational enrollment.

To the question, "Does vocational education receive credit in your state?," 28 states said "yes." The question did not distinguish between state or local approval and credit. The point is clarified in the reported discussion that states were counted even if it was districts that granted credit for vocational courses. In contrast, Dyrenfurth, in "State Trends: A National Survey" (1986, p. 44) found that only 13 states allow vocational education as part of several options to meet some of the states' graduation requirements.

On-Site Interviews

The study by the California Advisory Council on Vocational Education (Saul & Gull, 1985) selected seven high school districts in California with policies in place regarding the use of vocational courses to fulfill certain graduation requirements. The sample contained large urban and small rural programs identified through consultations with State Department of Education, vocational associations and local education personnel.

Two-hour structured interviews were conducted separately with the vocational directors and academic personnel (principals or superintendents) in each site. The purposes were to gather information on the process of initiating the alternative instruction, people involved, implementation method, the vocational courses that satisfy academic credit, criteria used to grant credit, and the effect of this policy on vocational education. Descriptions of each district were written up in the report, Opportunities for Vocational Education in the Educational Reform Act of 1983 (Senate Bill 813), and issues which arose from the interviews were discussed. Barriers and facilitators, approaches taken, concerns raised by the education reform movement, and the benefits to vocational education and to education in general which have been noticed or are expected were included.

Summary

High school graduation requirements have taken on many different forms over the course of history in the United States. Starting with oral examinations of narrowly prescribed academic subjects, graduation requirements moved to written examinations, "seat time" in specified subjects, and most recently to discussions concerning learner outcomes. During the 1900s, the idealized curriculum has shifted back and forth from an emphasis on a short list of traditional academic subjects to a broader notion of a comprehensive educational plan with emphasis on options and relevance to real world life skills.

The most recent series of educational reform reports starting in the early 1980s has again emphasized a need for the high school to focus on traditional academic subjects with one means being the recommendation to increase high school graduation requirements in those traditional subject areas. In this context, the "curricular space" left for electives such as vocational education has diminished. Some states have responded by relating vocational education to graduation requirements through allowing it to substitute for some part of traditional academic areas of study. Sorting out this relationship has involved many deliberations probing the purposes of secondary school, nature of a comprehensive high school, characteristics of an educated person, and effective structure of the educational enterprise.

From analysis of the literature related to the policy issue of vocational education and graduation requirements it was clear that this study needed to raise the following kinds of questions:

1. What exactly is the relationship between vocational education and graduation requirements in the states and schools to be examined? How did this relationship develop?

2. How is vocational education staffed under the relationship? How are the standards in the content areas of graduation requirements measured?

3. How are vocational education courses appraised for content relating to graduation requirements?

4. What are the risks and results of the relationship? Who gains?

5. How can the relationship be made feasible in practice? What are the costs? What are the barriers and facilitators of the relationship?

From previous studies it seemed apparent that the investigation could benefit from research methods involving detailed review of existing reports, policies, and supporting materials, surveys of knowledgeable people, and on-site interviews of those involved in relating vocational education and graduation requirements.

CHAPTER 3

METHOD OF STUDY

As described in Chapter 1, the purpose of this study was to investigate the potential relationship between vocational education and high school graduation requirements. Specifically, it was to describe the existing relationship between vocational education and high school graduation requirements at the state and local level in Minnesota and a sample of other states where extensive relationships are in practice. Further, the study was designed to identify important policy issues which need to be confronted in strengthening the relationship between vocational education and high school graduation requirements, alternative resolutions of these policy issues and their advantages and disadvantages.

The approach to data collection involved extensive interviews by telephone and in person at state office and local school sites. This approach allowed use of structured questions with ample follow-up to probe for complete responses and unanticipated aspects of description and issues.

Advisory Committee

In order to keep the research investigations focused on the highest priority concerns related to vocational education and high school graduation requirements, an advisory committee was convened to provide input during the study. Their charge was to raise questions, give alternative perspectives, and suggest new sources of information. The advisory committee was involved during three stages of the study: (a) during clarification of purpose and developing research design, (b) during data analysis and interpretation, and (c) during development of study recommendation.

Members of the advisory committee were selected to be representative of state and local levels of education, those responsible for vocational education and education more broadly, and those with special roles in improving vocational education. The advisory committee members and their present position are shown in Table 2.

Site Selection

The goal in selecting school sites in Minnesota and other states to be included in the study was to identify places which

Table 2
Project Advisory Committee Members

Member	Current Position
James Cole	Associate Superintendent, Anoka-Hennepin School District
Jeanette Daines	Specialist, Long Range Planning State Board of Vocational Technical Education
Rod Hale	Secondary Vocational Director, South Washington County Schools
Peggy House	Professor of Mathematics Education, University of Minnesota
Don Johansen	Supervisor of Curriculum Services, Minnesota Department of Education (since retired)
Ron Johnson	Specialist, Industrial and Technical Education, Minnesota Department of Education
John Mercer	Executive Director, State Council on Vocational Technical Education
Jane Plihal	Associate Professor of Home Economics Education, University of Minnesota
James Stone	Associate Professor of Business and Marketing Education, University of Minnesots

represented different approaches to relating vocational education and high school graduation requirements. This basic goal was thought to result in descriptions of approaches which were as diverse as possible within the funding constraints and time available for the study. Diversity was important in stimulating divergent thinking about the relationships in question, important policy issues, and their resolution.

Selecting School Sites in Minnesota

In order to get some idea of the extent and type of relationships between vocational education and high school graduation requirements in local schools in Minnesota, a written survey questionnaire was developed and administered to secondary vocational education directors in Minnesota at one of their regular meetings. The survey questionnaire is shown in Appendix A. From the survey results, an initial listing of local schools with a relationship between vocational education and graduation requirements was developed with a brief description of the relationship. Each of these sites was then called by phone to add more depth to the descriptions available from the survey questionnaire.

Using this information, a preliminary set of selection criteria was developed with the purpose of selecting about five local school sites for visiting and more extensive interview. The preliminary selection criteria were presented to the advisory committee for review and comment. From this process, the final selection criteria which emerged were:

1. A written provision for relating vocational education to high school graduation requirements had been approved as district policy or was under development.

2. The provision had been implemented--credit toward high school graduation requirements was being given for vocational education courses.

3. Different strategies or approaches were represented to relate vocational education courses to graduation requirements.

4. Sites represented different geographic areas of the state (i.e., large metropolitan areas, rural small town).

5. Different vocational education subjects (i.e., agriculture, business, marketing) were represented in the courses for which credit for graduation requirements was given.

Applying these criteria to the listing of school sites granting credit for vocational education toward graduation requirements resulted in selecting the following local school sites in Minnesota for closer investigation:

1. Anoka-Hennepin School District
2. Farmington School District
3. Viking Secondary Cooperative Center
4. Spring Lake Park School District
5. Wright Secondary Cooperative Center

Selecting Other States

A similar general strategy was used to select other states to be investigated to learn more about potential relationships between vocational education and graduation requirements. Instead of a survey procedure, the method used to identify a list of potential states for further investigation involved analysis of recent issues of professional journals (i.e., Journal of Vocational Education) and newsletters (i.e., Vocational Training News), telephone calls to persons thought to be knowledgeable in professional associations (i.e., American Vocational Association), federal agencies (i.e., U.S. Department of Education), and the National Center for Research in Vocational Education. A recent national survey of the effects of changing graduation requirements on enrollments in vocational education (Frantz, et al., 1986) also proved helpful. In each case as leads were developed through these means, follow-up telephone calls were made to the states identified to learn more about their provisions for relating vocational education courses and graduation requirements.

From this initial investigation, a preliminary set of selection criteria was developed to select three other states for closer examination. These preliminary criteria were also presented to the advisory committee for review and comment. The final set of selection criteria used to direct selection of other states was as follows:

1. A written state provision for relating vocational education and high school requirements had been approved.

2. The provision had been implemented--credit toward graduation requirement was being given for vocational education courses.

3. Different strategies or approaches were represented to relate vocational education courses to graduation requirements.

4. States represented different geographic areas of the country.

Using these criteria the states selected for study were:

1. Ohio
2. Virginia
3. Washington

In addition, Minnesota was studied at the state level so that comparable information was available.

Data Collection

As already noted, extensive use had been made of secondary sources and telephone interviews in selecting the school sites in Minnesota and other states before visits were made to each site. Notes were kept from secondary sources and telephone interviews.

The next phase of the study involved visiting each local school site in Minnesota and each of the selected states. In preparation for the visit, an interview protocol was developed to guide data collection through interviews and gathering of written materials. The interview protocols were developed in initial form and then the advisory committee was asked for their review and comment. The final interview formats are shown in Appendix B. Separate protocols were developed for state level and local school interviews. Major sections of the interview protocol included: (a) present situation and recent trends in vocational education and graduation requirements, (b) nature of arrangement for relating vocational education and graduation requirements, (c) barrier and facilitators in developing and implementing the arrangement, (d) reactions to the arrangement, and (e) future plans regarding the arrangement and vocational education. In each case, the protocol contains major questions and probes to elicit more complete responses.

Based on suggestions of the advisory committee, it was decided to interview at least one vocational educator and one general education administrator at each local school site in Minnesota and each state. The purpose of this approach was to gain the perspective of both vocational education and education more generally about the existing relationship between vocational education and graduation requirements, its history, policy concerns, feasibility and future. In each state, a local school site was also visited to gain their perspective on the arrangement and its implementation. Each of the interviews was tape recorded and transcribed for further study and analysis. The interviews were conducted during the period December, 1986 through February, 1987. Initial visits were conducted by both of the study staff in order to gain consistency in approach. Later visits were done individually by one or the other of the study staff.

Data Analysis and Interpretation

Data analysis really began during the review of related research described in Chapter 2 and in processing the results of initial telephone interviews prior to site selections. Following the in-person interview at the selected sites, additional reflection was given to the emerging data bases. Preliminary listings of policy issues were developed, questioned and revised during this time.

The study data consisted of related research, written and telephone survey results leading to site selection, and written materials and transcripts of interviews during visits to selected sites. The data was organized by site so as to facilitate analysis.

During the analysis, the data were read extensively. Step one was to develop a written description of each study site, particularly focusing on the relationship of vocational education and graduation requirements. Step two was to look across the sites, in the context of the review of related literature, to identify important cross-cutting policy issues which needed to be addressed in relating vocational education to graduation requirements. These policy issues were then described to the extent the data permitted. Step three was to identify ways in which each of the policy issues was resolved based on the data collected in the study and where the data permitted, to identify advantages and disadvantages of the resolutions. Content analysis procedures were relied upon as the method of analysis used in the above steps.

CHAPTER 4

DESCRIPTION OF SITES

This chapter provides a response to the first study question concerning the description of sites where vocational education is being used to meet high school graduation requirements. The descriptions are organized by state, starting with Minnesota and then moving to Washington, Ohio and Virginia. For each state one or more local school sites are described in order to get both a state and local school perspective.

State of Minnesota

High School Graduation Requirements

Graduation requirements in Minnesota for grades 10-12 are as follows:

Area of study	Minimum number of credits
Communication skills	3
Social studies	2
Health	1/2
Physical education	1/2
Electives	-
Total Units	15

Source: Rules of State Board of Education, Section 3500.2000, Curriculum for three-year Senior Secondary Schools and Section 3500.3100, Completion of Secondary School Requirements. One credit is equal to 120 hours of instruction.

Review of Recent Developments

About five years ago, the Minnesota State Board of Education became very concerned about providing equitable educational opportunities for students in Minnesota's high schools. The Board directed the State education agency to develop a set of minimum course offerings that should be available to all students in the state to insure some amount of equity in educational opportunity. Vocational education was included as one of the areas of the curriculum to be addressed by agency. The resulting report to the State Board contained minimum course offering recommendations for areas such as communications, mathematics, science, and social studies as well as vocational education. The recommendation relating to vocational education stipulated that all students have access to five or more different types of vocational education programs. The State Board accepted the recommendations but then encountered an old state statute which stipulated that the State Board could not require school districts to offer vocational education. Therefore the rule with respect to minimum course offerings for vocational education was dropped by the State Board while the rules relating to other curricular areas were ultimately passed and implemented. Those rules relating to minimum offerings are as follows:

Subject	Minimum number of credits to be offered
Communication skills	4
Mathematics	3
Science	3
Social studies	3
Foreign language	2
Music	2
Visual arts	2
Industrial arts	1
Health	1/2
Physical education	1/2
Electives (in five subjects)	10

The vocational education leadership in the state approached the legislature in the following year about changing the statute restricting the State Board from requiring the offering of vocational education. The legislature agreed to change the statute, opening the way for the state education agency to again approach the State Board concerning minimum required offerings in vocational education.

The recommendation of the state education agency to the State Board was to require a minimum of 560 hours of vocational education which could be made up of two different programs for 240 hours each or four different programs for 120 hours each. School districts could choose between these two options. It was now a full year later when the state agency was approaching the Board for the second time over this matter. By this time, several new members had been appointed to the Board and they had quite different positions on the idea of the State Board mandating any curricular requirements. Further, differences of opinion began to emerge from the vocational education community about the merit of the minimum course offerings for vocational education which were being proposed. Those questioning the recommendations noted that requiring the offering of vocational education might put in jeopardy the categorical funding for vocational education which was sometimes rationalized as being needed as an incentive for schools to offer vocational education. Their argument was that if vocational education was required to be offered, then perhaps there would be no need for incentive, particularly in the form of special categorical aid. Proponents argued, on the other hand, that the requirement for 560 hours of vocational education was very minimal and would only affect a relatively small share of students. In the end, the Board opted not to proceed with incorporating a minimum requirement rule for vocational education in Minnesota.

Given these past developments, district staff contacted in this study do not seem very sure about where the state agency stands on granting credit for alternative courses to meet high school graduation requirements. There seem to be different interpretations of the regulations regarding courses which can be used to meet graduation requirements. The regulations do not specifically state the role of local districts in determining requirements. There is also no regulation about how courses ought to be recorded on official high school transcripts. The State Board rules state, "A secondary school teacher should be able to teach subjects and perform services only in areas in which the teacher is properly licensed" (State Board of Educations Requirements, 3500. 3700). This vagueness has sometimes led districts to be creative and innovative in approaching the concept of alternative courses to meet graduation requirements.

Consequences and Options

One of the consequences suggested by state education agency staff to the lack of required course offerings in vocational education is a decline in course offerings and enrollments in vocational education. Further, there is reason to believe that equitable access to at least a minimal diversity of vocational education programs has declined, particularly in rural areas of the state where overall school enrollments have been decreasing. The effect of more emphasis on academic courses, combined with reduced enrollments and increased costs, has translated into fewer course periods in the school day and fewer elective courses -- all leading toward a decrease in access to vocational education, often in very inequitable ways among school districts.

As the state agency now looks to the future, the State Board emphasis on moving to the concept of learner outcomes may provide new avenues to address the contribution of vocational education to a comprehensive curriculum and graduation requirements. Further, several school districts have taken local initiative to develop relationships between vocational education and existing graduation requirements. If the movement by local schools continues to gain momentum, it may be feasible for the State Board to again consider the issue of vocational education's relationship to required course offerings and graduation requirements.

Anoka-Hennepin School District (Minnesota)

The Anoka-Hennepin School district is located north of the Minneapolis-St. Paul metropolitan area. The district contains three high schools each enrolling about 2550 students in grades 10-12. The school day is made up of six periods of 50 minutes each. The graduation requirements for the district are as follows:

Subject	Minimum number of credits
Social studies	3
Science	1
Mathematics	1
English	3
Physical education	1/2
Health	1/2
Total credits	15

Vocational courses meeting graduation requirements include the following:

Subject	Graduation requirement
Health careers	Health
Landscape and horticulture careers	Science
Occupational foods	Mathematics
Machine trades	Mathematics

Anoka-Hennepin's three high schools offer a wide range of vocational education courses, and employ a vocational education staff of some 60-70 people. Graduation requirements have not been changed in at least 15 years and no further increases are anticipated in the near future. Vocational education receives strong support from the community, and its enrollment has remained quite steady over the past eight years. In response to "some students having trouble meeting the requirements," alternatives for meeting graduation requirements were developed for students taking vocational education in large time blocks. Following a study of the future direction for vocational education in the district, the school board recommended, among other things, examining the use of alternative courses, including vocational education, to meet graduation requirements.

Credit arrangement

Four vocational education courses qualify for credit in mathematics, science, and health and are described as such in the students' registration guide. The courses meet district requirements for mathematics and science, and the state requirement for health.

Process

The use of vocational education courses to meet graduation requirements began about ten years ago. The first courses were approved informally. For instance, the horticulture teacher had a strong science background and it was felt that the horticulture course would meet the expectations of the district science requirement. The coverage of mathematics in machine trades and in occupational foods was recorded in order to prove that an hour per day (out of the 2 and 1/2 hour class) was actually spent on mathematics. The two-hour health careers program satisfies the 1/2 credit required in health. The hope is that some common criteria for evaluation of such courses will be established out of the work of the committee studying vocational education in the district.

In the early years this arrangement was thought of in terms of "waivers" of graduation requirements or "exemptions" from requirements. Today it is talked about as "alternatives" and in the registration guide it states, "The high school (science) requirement is met through..." The first course waiver did not need school board approval, but today the approval process is more explicit. A Curriculum Revision Form describes the procedure for any proposed course changes. The idea must be approved by both the curriculum advisory committee and the school board. Also, all department offerings are reviewed every five years, including alternatives. The arrangement to grant credit toward graduation requirements was typically initiated by administration.

Attitudes

Occasionally teachers have raised concerns over licensure, asking who should teach courses for credit toward requirements. "Even though we argued for a year and a half that apparently there are some students who do not learn in a regular academic classroom and that we would like to try and teach them... That doesn't go over very well." Some still don't believe "there are other ways to meet kids' needs."

Results

There has not been any great shift in students taking these courses. No data has been collected as to the extent of use of vocational education courses as alternative means of earning graduation credit. The arrangement has been in place for quite some time and is understood by students as an option. Some initially react with surprise at having a mathematics requirement being covered in a foods class. Some students "finally realize why they shove math at us a lot. It's the first time they've ever seen any need to have math."

Changes in vocational education courses meeting requirements include higher expectations for the students and perhaps more time on tests. "I think vocational courses will become more academic to the academic people, but it won't really change that much for the vocational people. I don't want us watering down vocational courses. The method of teaching and the way the students learn will be different. But it will meet the same end."

Farmington High School (Minnesota)

Farmington is a rural town some 40 miles from the Twin Cities metropolitan area. The school district enrolls 615 students in one high school, grades 9-12. The school has a seven period day with 50 minutes per period. The graduation requirements since 1981 have been as follows:

Subject	Semester credits	Year equivalent
Social studies	8	4
Science	4	2
Mathematics	3	1 1/2
English	8	4
Physical education	4	2
Health	1	1/2
Total credits	46 (28 required, 18 elective)	23

Vocational courses meeting graduation requirements are as follows:

Vocational course	High school requirement
Plant and soil science	Science
Horticulture	Science

Landscaping	Science
Animal science	Science
Natural resources	Science
Electricity	Science
Electronics	Science
Child growth and development	Science
People and foods	Science
Food for life	Science
Food service - occupational	Science
Agriculture business management	Mathematics
Business mathematics	Mathematics
Accounting II	Mathematics

Farmington serves students from mainly working middle class families, and is not only a farming community as its name suggests. A significant number of the graduates go directly into the workforce. Currently the district is working to upgrade its image in terms of standardized test scores. Along with the trend to "strengthen academics," the mathematics and science enrollments are "bulging," while vocational enrollment (especially agriculture) is falling. The interest of students in vocational education has also declined. Graduation requirements were raised about 5 years ago from 44 to 46 semester credits, with one semester of mathematics added at that time. Overall enrollment fell in the early 1980s and teacher reductions were made in most departments. During the past five years enrollment has been steady at around 615 students.

Credit Arrangements

Two semester credits of science and mathematics (local district requirements) can be earned by taking certain approved vocational education courses. These courses are listed in the registration materials so that students can plan programs accordingly. All vocational education programs have or are developing learner outcomes and the vocational education department has developed philosophy and mission statements which have "made more of a bond amongst us as a vocational program."

Process

Around 1971, when the science requirements were increased, staff became concerned that some students didn't need so much "pure" science. An informal task force was formed of vocational, special education staff and the principal, to look at alternative ways to meet the requirement. Agriculture, home economics, and industrial arts were the first sections involved. They reviewed the course curricula of all interested departments, highlighted the science principles and by this "informal assessment" selected those that qualified. The approval process has changed since those first classes were reviewed. With the most recent increase in mathematics requirements, a group of mathematics and business, agriculture, and home economics teachers and some administrators formed a review committee. "We talked, we shared. It was a mutual decision." We "tried to make sure everybody understands it and finally we have a consensus on it." This round was initiated by the administration in order to provide more courses to meet the district's high school requirement. The fact that it's written down gives it credibility. The vocational education department works at monitoring courses to make sure appropriate amounts of mathematics and science are being taught.

Attitudes

The principal in place during the initiation of this arrangement "felt strongly about the virtues" of vocational education. When the mathematics options were approved there were, however, questions raised about it, but "when they found out they weren't going to lose any staff members through cuts, they said 'Okay'." Today, the mathematics and business staffs are "very compatible" and the science people "know what is done in there (home economics)." "If we were lax on what we're doing, we'd come under fire."

Results

The arrangement has helped vocational enrollments in those classes receiving credit toward graduation requirements. These courses are taught with a science or mathematics base. "It's always in the back of my mind," notes an instructor. There are students planning these options into their programs. In an effort to do more public relations with the board and the community, some of the curriculum changes have been presented to the school board and will be written up in a newsletter soon. Students have also been good promoters of these classes. "We complement. We do not teach the basics, we apply the basics."

Spring Lake Park High School (Minnesota)

Spring Lake Park is a suburb in the Minneapolis-St. Paul metropolitan area. The high school enrolls 1267 students in grades 9-12. The school has seven periods per day with 48 minutes per period. The graduation requirements are as follows as of 1980:

Subject	Trimester credits	Years equivalent
Social studies	11	3 2/3
Science	5	1 2/3
Mathematics	5	1 2/3
Language arts	12	4
Physical education	5	1 2/3
Health	2	2/3
Total credits	69 (40 required, 29 elective)	23

The vocational education course meeting graduation requirements is "Principles of Technology" which meets the local two-trimester requirement for science.

Spring Lake Park High School has enjoyed a relatively stable enrollment, while neighboring district schools have dropped to less than half the numbers of five years ago. A growing population, "mainly working middle class and basically blue collar," has helped keep the enrollment up in Spring Lake Park. The vocational enrollment has also been steady, partly due to a "good support base from the administration." The school offers numerous unique courses in an effort to provide a comprehensive education to all students. A large number of advanced placement courses from laser holography to oceanography, and vocational programs such as "On-Site Home Building" and "Opportunities in Emergency Care" (complete with ambulance service) demonstrate the administration's commitment to finding innovative ways to meet the varied needs of students. Although 65 percent of graduates go on to postsecondary education, the superintendent feels strongly about the need for vocational education.

Credit for Vocational Education

One successful new course venture has been the "Principles of Technology" (PT) course, which has been taught for three years now by a "14-year master industrial arts teacher" with some industry experience. A school administrator calls it "the best thing since sliced bread" as he explains how the course provides students with a basic core of mathematics and scientific concepts. Two trimesters of the course meet the local two-trimester requirement in science. This course was the only one thus far to attempt earning credit with vocational education toward graduation requirements in Spring Lake Park. Trained in the use of the curriculum at the Center for Occupational Research and Development in Waco, Texas, the instructor now consults with the physics teacher(s) to sharpen his skills for teaching the science concepts needed in PT. Likewise, the physics department has been exploring the application of certain concepts by consulting with the industrial arts teacher in PT about equipment.

Process

Spring Lake Park High School belongs to a consortium of nine school districts forming an intermediate school district to provide postsecondary vocational technical education at Northeast Technical Institute (NTI). On hearing that NTI had purchased the rights to "Principles of Technology," the administration at Spring Lake Park "jumped at the chance" to be a pilot site. They began its promotion, acquiring the school board's approval to hire a new teacher. In order to get approval for the PT course meeting a science requirement, the instructor presented a resolution to the school district's program evaluation committee. It was approved there, then by the superintendent, and eventually by the school board. This was considered a special case so no formal process has been written up for other vocational education courses with similar goals.

Results

Now in its third year, the course has grown from one section of 21 students to three sections of 25 students. It was developed with the "middle 50%" group in mind, for those who probably would not pursue college and would likely seek postsecondary vocational training. The course is listed in the registration guide for students in the Advanced Placement section. About 15 of the 50 students in the first year PT are using it to meet a science requirement. This amounts to about 1.5 percent of all students using PT for the local science requirement.

Attitude

In general, an attitude of enthusiasm, mutual respect and high expectations characterizes the relationship between the administration and the PT instructor. In the words of the PT instructor, "This particular district is really unique. We've got a good support base from the administration. We had some very strong people that were pushing vocational education. Our board overall gives us a tremendous amount of support." And a representative from the administration says, "We have been really fortunate in having an outstanding individual in charge of that (PT)...If it wouldn't have been for him and his academic credibility, science would've never bought into it. He is a master teacher, a master vocational educator, and he's an academician besides...one of those rare gems who is an extremely bright individual with a real earthy common sense and has chosen as his career vocational education." Informants reported that

63

the arrangement seemed to be accepted in the school by other teachers.

New Ulm High School and Viking Cooperative Vocational Center (Minnesota)

New Ulm is a rural town in south-central Minnesota. The school district enrolls 700 in one high school, grades 10-12. Viking Cooperative Vocational Center enrolls 190 students from three high schools, grades 10-12. The school runs on a seven period day, 50 minutes each period. Students are required to take five subjects per quarter. The graduation requirements are as follows:

Subject	Minimum number of credits
Social studies	3
Science	1
Mathematics	1
English	3
Physical education	1/2
Health	1/2
Total credits	16 1/2

Three credits of vocational agriculture meet one credit of the science requirement.

The New Ulm High School is a small, "conservative and traditional" school serving a relatively healthy farming community of largely German descent. Enrollment had dropped significantly about 6 years ago, but it has been stable at around 700 for the past 3 years. The requirements for graduation have gradually increased from 15 credits several years ago to the current 16 1/2 credits. The increases have not been for specified courses. The school does require an additional mathematics and science credit beyond the state requirements.

Credit for Vocational Education

Vocational agriculture receives credit fulfilling the local science requirement. The option is listed in the student registration guide saying "3 credits of agriculture satisfies the science requirement." As the agriculture instructor put it, "It gives some kids an option. I don't know if it's good for every kid, but let's give them an option." It was also mentioned frequently that "kids get a lot more science than the state requires already."

Process

The agriculture instructor noted that there was once a state mandate over twenty years ago that said that three years of agriculture education could be used in lieu of one year of science. "It was thought that we cover enough practical science to cover that." The arrangement has been in place in New Ulm ever since.

Results

An estimated 25 percent of the agriculture students take advantage of this science credit option. It allows the students to get "what they need," since most will return to the farm or get a job and will not attend college in the years immediately following graduation. An administrator said this option allows students to obtain a relevant education, and get a lot of science both through agriculture and through their junior high science courses.

Attitude

The agriculture program is spoken of highly by the administrator representative, saying it is an excellent program and that the FFA organization is outstanding in performance and participation. The agriculture teacher also commended the current administration as "the most receptive about what happens to our kids," saying they were concerned about "all the kids, not just part of them." When enrollment had dropped a few years ago, science teachers raised questions, perhaps hoping to save a position if traditional science courses were required by all students. When science and agriculture courses were reviewed this year as part of a total school curriculum review, with learner outcomes listed for every course, questions about the vocational options were raised again. It was explained that these are not college-bound students, and that most return to farms or go to work after graduation. Vocational agriculture was meeting their needs. The arrangement was accepted as it stands. The vocational agriculture instructors value the science courses, and "we encourage all our agriculture students (250) to pick up their biology." To make biology more relevant for many students, agriculture production is often incorporated into the biology materials. "They do a good job of relating it to production agriculture. They use corn and soybeans (as examples), for instance."

Viking Cooperative Vocational Center

The Center serves three area high schools. The vocational director is exploring various ways to present vocational education at the secondary level, since enrollment had dropped from an initial 365 to 190. Enrollment has held steady for the past three years. Students taking a two-hour class at the Center lose an additional hour in transportation to and from the Center, which leaves only four hours for the graduation required courses and any electives. Many are choosing to stay at the home schools all day. "We're competing against band trips to Florida and Spanish Club trips to Spain" for those few hours left after traditional courses are scheduled.

Concerning granting credit toward graduation requirements for vocational classes, it was suggested that some direction from the state department of education would be helpful. Programs now have competency-based instruction and several have been explored for their mathematics and science applications. The staff is proceeding with caution in order to be sure not to "undercut requirements by making watered-down substitutes." The director also believes that mathematics and science teachers ought to be involved. "But," he says, "the question of licensure is going to have to be resolved, number one."

Maple Lake High School and Wright Vocational Cooperative Center (Minnesota)

Maple Lake is a small rural town in central Minnesota. The high school enrolls 180 in one high school, grades 10-12. The school has seven periods per day, 50 minutes in each. Wright Vocational Cooperative Center enrolls 800 students from ten high schools, grades 10-12. Since 1981, graduation requirements at Maple Lake High School are as follows:

Subject	Quarter credits	Year equivalent
Social studies	10	2 1/2
Science	4	1
Mathematics	4	1
English	12	3
Physical education	2	1/2
Health	2	1/2
Career exploration: Agriculture, Art, Business, Home economics Industrial arts, Music, or a Wright Vocational Center program	4	1
Total credits	66 (38 required and 28 elective)	16 1/2

The vocational course meeting graduation requirements (beyond those required for career exploration) is vocational agriculture, where two years of study meets 1/2 credit in mathematics or science.

Maple Lake High School is one of ten member districts in the Wright Vocational Cooperative Center. Over the past five years, six schools have had increasing enrollment, two are steady and two have lost enrollment. Maple Lake dropped enrollments some five years ago, and has reduced its staff. Vocational education has had a greater decline proportionally, due partly to the emphasis on "academics."

There has been a big change in student attitudes about courses needed in high school. "Language requirements from the state, entrance requirements at colleges, everything they're hearing about technology in postsecondary vocational schools...a real need for science and math. I think that's had a tremendous impact." One response at Maple Lake has been to develop "more applied mathematics courses" taught by the mathematics department. As part of the 16 1/2 credits, with an additional year of science and mathematics added about five years ago, at least two semesters from two of the following fields must be taken in an effort to encourage career exploration: business, music art, vocational agriculture, or industrial arts.

Credit Arrangement

Vocational agriculture courses can earn a limited amount of science or mathematics credit. When the arrangement was set up three or four years ago, there was a full-time agriculture instructor and the school was on the quarter system. Students could take three to four years of agriculture classes and earn one science or mathematics credit, depending on the courses. Now, with reduced numbers of agriculture courses offered and the change to semesters, very few students are able to take more than two years of agriculture classes which amounts to only 1/2 credit. "Last year 1 student out of 60 used it toward graduation." It is not advertised as an option. The alternative or option is put into effect only when a student has not met all the necessary graduation requirements and alternatives are needed during the student's junior or senior year. Maple Lake High School only allows agriculture classes taken within the school to qualify for the credit, not those taken at Wright Cooperative Center.

Process

After increased requirements for mathematics and science were put in place several years ago, the agriculture instructor at Maple Lake heard students complain that the requirements were making it difficult to take vocational education courses. He presented his curriculum for review by the principal, and the science and mathematics teachers. Credit was negotiated between the agriculture and science and mathematics teachers. A recommendation was made to the school board, and was adopted.

Attitudes

"There was total support by the board," for the arrangement with vocational agriculture. "If anything, they would want more credit to be granted." Opposition did come from other staff members when the requests were first made, because they felt this went against the recommendations for setting higher standards. One dispute over recruitment arose from the arrangement. At the present time most staff seem to feel that academic and vocational courses don't have to be in opposition, that there's a need for both, and that vocational education can become more of an application of academics. An administrator thinks "it's healthy to blend the academic and vocational" and that technology is having a big effect upon the acceptance of credit for vocational education.

Results

As a result of the credit arrangement, the curricula for the plant and animal science courses were developed with science concepts in mind and business and marketing management with mathematics concepts in mind. "Very specifically, they were looking at science and mathematics concepts that could be incorporated." Yet, although the policy is in place, it is not promoted and is rarely used.

Wright Vocational Cooperative Center

The largest center in the state, Wright Vocational Cooperative Center serves ten high schools and has had a steady enrollment of around 800 for the past two years (day school) and another 50 students in the evening alternative school. The Center has grown, having several temporary buildings added. Students lose one hour in travel to use the Center, so typically only four hours are left at the home school for other required and elective courses. To ease some of these scheduling conflicts, the Center allows students to attend the night school free to get the required courses as long as they take vocational education during the day.

Process

The Center's director initiated an arrangement to grant credit for vocational courses taken at the Center. He obtained approval first from the Center's Board, then went to the superintendents and finally the principals. A committee of two staff from Wright Center, two high school principals, and a Center board member reviewed the course proposals which had been submitted by the vocational center teachers and weighted them for mathematics and science content (based on time-on-task). Several programs were approved for full or partial credit and districts then had the option to accept the vocational programs to meet high school graduation requirements which had been developed by the committee. However, most districts are not using this arrangement.

Attitudes

There seems to be competition for students between the home schools and the cooperative center. Center staff are very concerned about a sudden rise in dropouts, feeling it is due to the increased graduation requirements to a large extent. There seem to be misunderstandings over the academic background of vocational teachers at the center (such as not realizing they have college degrees). The Center administration believes in the contribution of vocational education to graduation requirements and says it must be "pushed, explored, and made to work."

Results

Neither the schools nor the Center list the approved options in their registration materials. Since courses are not approved uniformly in each district, it is now printed only in the committee's minutes. In fact, the option is rarely used in any of the member schools. It's possible, but as noted by administrators at Maple Lake, "none of the students have ever asked" to have courses at the Center be considered for credit toward graduation requirements.

State Of Washington

Since 1985, the state high school graduation requirements in Washington, grades 9-12, have been as follows:

Subject	Minimum number of credits
*English	3
*Social studies	2 1/2
*Science	2
*Mathematics	2
Occupational education	1
Physical education	2
Total credits	12 1/2 credits in required areas
	5 1/2 credits elective

* Increased in 1985.
Note. One credit equals 150 total hours, or 180 50-minute periods.

According to the Revised Code of Washington, "Vocational education shall mean a planned series of learning experiences, the specific objective of which is to prepare persons to enter, continue in, or upgrade themselves in gainful employment in recognized occupations, homemaking, home and family life programs, and volunteer fire fighting training, which are not designated as professional or requiring a baccalaureate or higher degree" [(RCW) 28c.04.020 (4)). Washington's high schools appear to have a very strong vocational education program attributed to high standards (for teachers and programs) and a good financial base. State funding accounts for about 80 percent of the costs of approved vocational programs, and the formula is based on the number of students served. Vocational education has enjoyed a relatively stable enrollment overall, with some increases in business education, and decreases in agriculture and industrial arts, in keeping with national trend away from production and toward service occupations. Before state requirements were increased, there was a slight drop in vocational education enrollment, which then returned to previous levels in only two years. At the same time enrollment grew in foreign language, English, science, and mathematics. These changes are believed to be the result of parent and student reactions to national excellence in education reports. The actual graduation requirements in most school districts, however, were not increased much since most were already equal to or greater than the new state requirements. There has been a movement in many districts to a more traditional program evidenced by an increase in semester systems, six-period days (as opposed to seven or eight), and 9-12th grade high schools. Small vocational enrollment losses were reversed during 1985-86.

Motivation

State graduation requirements were increased in 1985, partly as a response to a 1980 study of Washington's sophomores and seniors, finding that those considering themselves general, or nonvocational and noncollege bound, "weren't getting a very positive educational experience." With the concurrent public focus on excellence, the drop in vocational enrollment (although slight), and state plans to increase graduation requirements, many in vocational education, art, music, and foreign language wrote letters and gave public testimony supporting student access to a broad program of education. Access to vocational skill centers, which demand travel time, was of particular concern.

Process

Vocational education tried to figure out a way for students to be able to take both vocational and the required academic course areas. The State Board and a legislator initiated the present "equivalency" program, thus removing the legal barrier to alternatives. The result was a 1985 legislative amendment to graduation requirements allowing districts to grant credit for alternative courses. WAS 180-51-025 states,

> The content of courses and the determination of which courses satisfy particular subject area requirements and whether a particular course may satisfy more than one subject area requirement for different students shall be determined locally in accordance with rules adopted by boards of directors of districts.

Washington's school districts have a large degree of local autonomy. Although the state lists subject area requirements, districts interpret the meaning of those requirements. Districts determine the subjects, competencies, and the guidelines for how other classes can meet those competencies. The one exception is social studies, where subjects are spelled out by the state.

Credit Arrangement

Districts can approve of courses to meet both state and local requirements. There is great variety to the courses given equivalency credit and the methods used to judge the amount of credit among districts. The methods used to judge the amount of credit to grant range from an administrative decision to committees comparing course competencies and/or measuring time spent on academic skills content. Workshops for school staff present a wide range of approaches and the districts are allowed to develop their own guidelines.

State Role

After some districts had developed models, the State Department of Education began to facilitate the process for other districts via inservices programs. The Department views its role as providing options, direction, support, and some grant money for inservice. Regional workshops were held last year, where vocational and academic teachers and administrators were informed of the options and had a chance to compare models and begin planning for local use. These were funded by local districts and were well-attended. After the fall, 1986 vocational directors meeting, about 50 percent stayed for an optional follow-up workshop on equivalency credit. State leaders admit, "We're still in the learning stages."

Results

Some of the results of the arrangement which now seem apparent are as follows:

1. Although the majority of districts have at least one equivalency credit in place, the level of use by students toward graduation requirements is minimal at this time. It simply provides another option.
2. Equivalency crediting is easier to document in some subject areas than in others. For instance, mathematics and science in electronics seem to be easier to show than in service occupations such as food service or merchandising.
3. A number of trade and industry teachers are certified through the work experience/teacher education route rather than a degreed, general teaching certificate route. This situation is causing some question of their ability to teach academic content.
4. The arrangement is received much better in areas with growing enrollment.

Puyallup High School (Washington)

A very fast growing and "very supportive" school district, Puyallup is made of 20,000 residents in the city and some 60,000 beyond the city limits. More growth is projected in the near future. There are two high schools (grades 10-12) with 1300 and 1700 students, up about 500 in the past five years. During the same time vocational enrollment has doubled, from 440 to 850 FTEs.

Puyallup had previously had a large production agriculture program, but "there are no farmers in this valley anymore," so there's been a shift toward horticulture. Business education has grown with approximately 90 percent of all students taking some business education course.

Credit Arrangement

A few years before the state's equivalency options were put in place, Puyallup had offered mathematics credit for a commercial foods program and also in business. Since then it has become "a little more difficult" to get vocational courses approved to meet academic graduation requirements. It is believed that this arrangement has really "bumped up enrollments" in agriculture-related courses.

Kent High School (Washington)

Enrollment at Kent High School averages 1350 students in each of three high schools, grades 10-12. About 950 full-time equivalent students were enrolled in vocational education courses. Vocational enrollment has held steady over the last five years, although it has become a smaller percentage of the total student body. One trend is lower enrollments in introductory metals and woods courses, due to the belief by students and parents that manufacturing jobs will disappear while service areas grow. Home and family life programs are full in all three schools. In the 1970s the school board decided not to build a vocational skill center in order to avoid duplication of the expensive programs in postsecondary schools. Instead each school houses four different "transfer programs" and each has a full business and office, marketing and home family program. There is a district site for agriculture, forestry and landscaping. For specialized programs, students are bussed between high schools.

Credit Arrangement

The equivalency credit was first used in 1969-70 when the agriculture/mechanics instructor, who routinely included "a lot of practical science and math" in his classes, approached the science teachers and the principal in his school with the idea. They agreed and decided to grant science credit for the agriculture, forestry, and mechanics courses taught by this teacher. Soon afterward, business communications got English credit and economics got social studies credit. Very few students used these options, however, since most completed their only science requirement at the time in the 9th grade. There are more courses that are now approved for equivalency credit and more students use the options since graduation requirements have been raised. The option is promoted in the registration materials used by students. The approval process for courses has become more standardized, with written guidelines, committees and school board approval required.

State of Ohio

The high school graduation requirements (grades 10-12) in Ohio are as follows:

Subject	Minimum credits
English	3
Social studies	2
Science	1
*Mathematics	2
Physical Education	1/2
Health	1/2
Elective	9
Total credits	18

Note. One credit equals 120 total hours, or 180 40 minute periods.
*Increased in 1987 by adding one unit of mathematics.

Vocational education in Ohio looks very different than in Minnesota. One-half of the vocational education occurs in comprehensive high schools, and the other half in joint vocational schools. These joint vocational schools offer students a full range of courses, all in one building. In addition to the traditional graduation-required courses, many centers have added mathematics, science, and communications "options" which are directly related to the occupational areas. These new courses are called "applied academics."

Motivation

A 1975 ruling requiring that all districts make a comprehensive vocational education program available made vocational education very accessible. However, as national studies urged more "academics," business and industry demanded increased basic skills, state and local graduation requirements increased, college admission requirements increased, and enrollments declined, it seemed obvious that vocational education had to change. Vocational education enrollments have dropped steadily since 1979; however, in the past two years there have been signs of a turnaround. Some 70 percent of all vocational classes are taught in the trade and industry area.

Process

Ohio examined its assumptions about what vocational education is and what it should do, in order to judge proposed reforms. In 1983 the State Department of Education's Division of Vocational Education approved nine pilot projects which experimented with method, curriculum, staff, and schedule flexibility. Each project site was visited and evaluated during the second year by state vocational education staff, who then wrote up guidelines for other schools wishing to implement similar programs. These guidelines stated that "programs" must:

1. Meet new secondary requirements
2. Use certified "academic" teachers for courses receiving academic credit
3. Be cost effective (not require additional state funds)
4. Reinforce basic skills
5. Establish a basis for training and retraining
6. Support occupational and employability needs
7. Enhance cross-over opportunities for college-bound students

Three types of program options have been developed, which vary in the ratio of vocational to related academic time.

State Role

The plan was presented to directors, superintendents, and the state staff for feedback. Eleven required one-day regional workshops were conducted during the summer of 1985, for all "academic" and vocational teachers and administrators from schools interested in starting an "applied academics" program. The Vocational Division hired three teachers (mathematics, science and communications) as consultants to develop curricula, materials, and resources for the workshops. They spent time with vocational educators beforehand, learning how to make application, in order to develop models. Performance objectives were also covered in these workshops, since by 1990 performance objectives will need to be written for all communications and mathematics courses including those considered "applied academics."

In order to assure that the academic content is substantial and also related to the vocational course, teachers are required to submit for approval a "course of study" to the Division of Elementary and Secondary Education, and a "correlation chart" to the Division of Vocational Education. They are also required to have 40 minutes per week of planned coordination time between the vocational and "applied academic" teachers to make sure that the academic part of the class is truly related to the vocational area. Most sites needed more time during the first year as "each learns what the other has to offer."

Funding

The state provides flexibility to implement the new arrangement in curriculum and in funding use. No extra funds were required of the state to implement the new arrangement, but the funding structure did change. Previously, the state had funded per teacher. A full unit of instruction was one teacher for five periods--three laboratories and two related courses. With applied academics, they moved to paying per instructional unit, meaning that in some schools vocational teachers shifted to more laboratory time, while applied academic teachers were hired (with vocational funds) to take on the related periods. The decision to fund academic teachers rather than use the vocational teachers for related-study periods was based on state regulations explicitly requiring teacher certification in areas receiving academic credit.

Credit Arrangement

The goal was to strengthen academics by creating new "applied academics" courses whose content is directly related to the vocational laboratory content. The course of study is analyzed by the school to determine if there is enough, for example, mathematics to build one or two units of mathematics in the related period(s). Only full credits are given--no partial ones. Some vocational programs include a mathematics credit in the senior year. Students taking a vocational program cannot opt out of the "applied academics" portion if there is one. All joint-districts offer a traditional 9th grade English and 12th grade social studies courses not funded by the State Vocational Education Division.

Results

As of spring 1987, 35 districts are now involved in program options. The Division is currently encouraging vocational teachers to get certification in one of the academic areas, believing that a better grounding in underlying principles will insure that academics are taught to students and made more applicable to other tasks throughout their lives.

Some of the experiences with applied academics are as follows:

1. Some academic teachers have problems at first because they aren't used to making application. Similarly, some vocational teachers are initially uncomfortable having other teachers in their classrooms.

2. To allay vocational educators' fears that the academic teachers would reduce their numbers, schools have assured vocational teachers they would not lose jobs. They have

started new programs or looked for other ways to employ teachers, such as team teaching, employability skills classes, or special interest topics classes. Some have added time to their school day.

3. Many have lowered class time to the minimum 40 minutes per period in order to provide time for more courses.

4. Some vocational programs in comprehensive high schools have initiated program options.

5. Substantial vocational enrollment growth has been noted, with an increase of some 2500 students since 1985-86.

Montgomery County Joint Vocational School (Ohio)

In one of the state's largest school districts, Montgomery County Joint Vocational School draws students from 27 schools with an enrollment of some 1870 students. It is now completing its second year of program options, which come under the supervision of an academic supervisor.

A team approach is taken which means that there are two teachers for all courses in the options program. They divide the time blocks, but work very closely on curriculum and usually attend each other's lessons. During the two years, the school has increased its nonvocational staff from 20 to 35, while the number of vocational instructors has held steady. With the greater number of teachers to supervise, three "teacher mentors" (mathematics, science, and communications) are now used to assist in each of the applied academics areas. There has been a substantial growth in student enrollment at this school, since program options have been initiated.

The mathematics mentor explained the process of developing the curriculum with the vocational instructor and together they laughed at their first year's struggle and marvelled at how much the program had improved in the second year and how applied mathematics is now becoming much clearer to her. They admitted that it was difficult for each at first because they were simply not used to thinking about relating application theory to vocational skills.

Pioneer Joint Vocational School (Ohio)

Another school with program options and great growth in the past two years is Pioneer Joint Vocational School which draws from 14 school districts. With 54 percent of the vocational programs converted to "applied academic options," the school intends to have 76 percent of the vocational programs converted to "applied academic options" next year. Each vocational teacher teaches two vocational blocks of instruction. The applied academic teachers coordinate curriculum with vocational teachers, but they do not team teach; rather they are alone in the classroom. Pioneer allows 12 days during the year for coordination time between vocational and applied academic instructors.

In contrast to Montgomery County, here the program options come under the supervision of the Vocational Supervisor. At Pioneer all Applied Mathematics and Science courses are taught in the junior year and Applied Mathematics II and Communications are taught in the senior year. All students must pass a basic comprehensive mathematics course, before advancing to the trade specific mathematics required as part of the vocational program.

State of Virginia[1]

State high school graduation requirements for grades 9-12 (approved July, 1983) are as follows:

Areas of study	Regular diploma	Advanced studies program
English	4	4
Mathematics	2*	3*
Laboratory science	2*	3*
Mathematics or science	1**	-
Social studies	3	3
Health and physical	-	-
Education	2	2
Foreign language	-	3
Electives	6	4
Total units	20	22

* Must be selected from a list of courses approved for graduation requirements by the Board of Education.

** Must be selected from a list of courses approved for graduation requirements by the Board of Education or, as an alternative, this requirement may be met by completing the sequence of courses needed for occupational preparation in one of the following programs: agriculture, business, distribution, health occupations, occupational home economics, or trade and industrial education.

---

[1] Major sections of this description are taken directly or in part with some reorganization from a paper entitled "The Vocational Approach to Math and Science," prepared the Vocational and Adult Education section of the Virginia Department of Education and dated July 1984.

The standard unit of credit for graduation is based on a minimum of 150 clock hours of instruction.

State Overview

The report Nation at Risk, along with other factors, stimulated the State of Virginia to increase high school graduation requirements in 1983. The change meant an increase from an 18-credit to a 20-credit minimum graduation requirement for a regular diploma. A 22-credit diploma in an advanced studies program also was made available for students who qualified. With these changes, the state agency vocational education staff moved quickly to develop an option for one of the mathematics and science credits through use of vocational education courses.

Motivation

Virginia vocational educators recognized that implementation of the Nation at Risk report recommendations without regard to the impact on students enrolled in or interested in vocational electives would result in vocational education "at risk" or worse--"at rest." State leaders of Virginia vocational program services decided that this was not the time to sit back and wait to be eased out of the educational scene. It was a time for positive, creative thinking and action about a plan to find time for vocational education.

The first link in the chain of events that followed was the coordinated effort to convince the Virginia Board of Education to accept the completion of certain occupational preparation programs as a substitute for a mathematics or science requirement.

State Role

The problem of finding time for vocational education and the related need to make administrators and others aware of the strength and complexity of vocational mathematics and science were the central topics of discussion during lively state program service staff meetings. Each program service prepared a summary of the applications of mathematics and science in the curriculum of the service area. The individual reports were presented at subsequent staff meetings, and the combined report of all services was developed and entitled "A Report on the Inclusion of Mathematics and/or Science in Certain Vocational Education Programs."

The next step was to gain the support of state leaders of mathematics and science education. Then the Administrative Director of Vocational and Adult Education presented the combined mathematics/science report to the Virginia Board of Education. The presentation included assurances of support from the mathematics and science education leaders within the Virginia Department of Education.

The Board approved the vocational alternative to the requirement of a mathematics or science course to complete a 20-credit diploma program, making the following option available to local school divisions:

> . . . this requirement may be met by completing the sequence of courses needed for occupational preparation in one of the following programs:
> Agriculture
> Business
> Distribution
> Health Occupations
> Occupational Home Economics
> Trade and Industrial Education

Although the standards did not permit substitution in Industrial Arts Education and in the Consumer and Homemaking component of Home Economics Education, efforts are underway to take recommendations to the Board regarding these areas.

Given the Board's approval for the vocational alternative, the next link in the rapidly moving chain of events was the urgent need to develop guidelines for vocational education program options to be made available to localities to meet the mathematics and science requirement. It was necessary to identify course sequences in occupational-preparation programs in which a mathematics or science alternative could be allowed. Each program service prepared material for its section of a publication to be developed by the Division of Vocational Program Services. A committee composed of selected program service leaders and the curriculum supervisor was appointed to combine all the service information into an "options booklet." After format and contents of this publication were determined by the committee, the final preparation and printing of the booklet was assigned to the curriculum supervisor.

A frenzy of activity followed within the curriculum unit. Because of the pressing need and demand for the information by local school divisions, the booklet had to be ready in about ten days. Curriculum personnel referred to their fast-paced developing product as the "Acc-Pak" (accreditation packet). Its formal name later became Occupational Preparation Program Options, Effective July 1, 1984.

The initial distribution of the options booklet was by general education administrators within the Department of

Education who were responsible for interpretation of the new accreditation standards during regional workshops organized for this purpose. This represented an unplanned and unexpected use of the publication and became a major force in the dissemination process.

The "Acc-Pak" became an instant success in the regional workshops. This booklet was reprinted a number of times to meet the demand for it. Prior to each printing, revisions were made as indicated by the general educators conducting the regional workshops and by local school divisions. It required some time to make all the needed adjustments to achieve accuracy and adaptability to varying situations.

The next phase of the distribution process was to send the booklet with a memo from the Superintendent of Public Instruction to all superintendents of local school divisions, principals, guidance personnel, and vocational directors.

The Director of Vocational Program Services, selected service area associate directors, and the curriculum supervisor then met with state leaders of guidance and counseling to explain the new options and to distribute the booklet. All of the guidance representatives at the meeting were immediately supportive of the effort and of the booklet and wanted additional materials such as task lists for competency-based education.

Many informational meetings have been held in localities to present the vocational alternatives and to make participants aware of the options booklet. The curriculum unit regularly distributes substantial quantities of the publication, when available, to fulfill the numerous requests for it. The experiences with the "Acc-Pak" may be summarized as being in the right place at the right time with the right information.

Credit Arrangements

The Contents of the Occupational Preparation Program Options booklet was designed to provide (a) general statements that apply to the offerings of all program services and (b) specific information about the revised program structure for each service area. The following general statements serve as guidelines to localities which allow the completion of a sequence of courses needed for occupational preparation to substitute for a mathematics or science course requirement:

1. Mathematics or science applications essential for program completion must be a visible part of the instructional program.

2. An approved vocational program, requiring a minimum of 300 hours of instruction, must be completed in order to substitute for the mathematics or science course.

3. Options not presented in this document will require program approval by the appropriate program service.

The following general recommendations are made to school divisions which elect the vocational alternative to the mathematics or science requirement:

1. Involve occupational advisory committees in identifying appropriate options.

2. Ensure that instructional time is protected by not allowing unnecessary interruptions.

3. Recognize that vocational student organization activities, as integral parts of the instructional program, are not interruptions of vocational teachers' time.

4. Permit coordinators of cooperative programs to maintain flexible schedules to provide coordination activities during the varied time frames in which cooperative students work.

Specific information about the revised program structure for each service area is contained in color-coded sections corresponding to the program services. The following common components are included in each section: (a) the service definition of a program completer, including any exceptions to the definition; (b) an overview of all occupational-preparation programs and courses offered by the programmer; (c) clarification concerning the applicability of mathematics and/or science for all programs; (d) sample schedules of courses for a 20-unit diploma, indicating how and where an occupational-preparation program may fit into the schedule; and (e) sample schedules of courses for a 22-unit diploma, showing how time can be found for vocational courses, even though substitution is not permitted in the 22-unit diploma in spite of the demanding requirements of this advanced studies program.

In addition to these common components, there are special features in certain sections. For example, one service area includes recommendations for increased student accessibility to program offerings. Another provides five new options designed for scheduling flexibility and for improved career selection and development.

Results

Several recent events, in addition to those described, relate to the continuing theme of the interrelationship of vocational education and mathematics and science instruction in Virginia. Only time will tell to what extent these happenings are linked to the chain of events summarized to this point.

1. There is a strong emphasis on mathematics and science in the high-technology technician-preparation programs being proposed and developed. Mathematics and science educators are working with vocational educators on this project and in connection with the Principles of Technology instructional system being developed by the Center for Occupational Research and Development (CORD) and the Agency for Instructional Television (AIT), in cooperation with state and local education agencies.

2. Industrial Arts Education and Home Economics Education are working closely with science educators to prepare additional vocational alternatives to the science requirement. In Virginia, the Home Economics Education Service has changed the name of certain courses to reflect the science concepts inherent in the subject matter. For example, Food Management has been change to Nutrition and Food Science Applications.

3. The Richmond School Board has initiated a landmark change by requiring that all students in city schools take two vocational education courses to graduate. The decision is coupled with a stiffening of graduation requirements in general, including a computer science course.

These and other events seem to indicate that general and vocational education may be working together in a positive, cooperative manner, beginning with mathematics and science and possibly extending this relationship to other partnership efforts.

Fredericksburg City Public Schools (Virginia)

The Fredericksburg City Public School enrolls about 900 students in grades 9-12. The system requires a minimum of 28 credits in grades 8-12 for graduation. Four diplomas are offered to students: (a) Enriched advanced studies diploma, (b) advanced studies diploma, (c) general diploma, and (d) vocational diploma. The specific requirements of these diplomas are as follows:

Area of study	Enriched advanced studies	Advanced studies	General studies	Vocational
English	5	5	5	5
Social studies	4	4	4	4
Mathematics or science	-	-	1*	1*
Mathematics	5	4	3	3
Science	5	4	3	3
Foreign language	3	3	-	-
Health/ physical education	3	3	3	3
Vocational	-	-	-	3-6
Electives	5	5	9	3-6
Total units	30	28	28	28

* As an alternative, this requirement may be met by completing the sequence of courses needed for occupational preparation in Business, Marketing Education, Practical Nursing, Food Occupations, or Trade and Industrial Education (Maintenance and Repair).

About 55 percent of students pursue the two advanced diplomas. Students are generally discouraged from pursuing the general diploma because, if taken, they are not ready for college and they don't have an occupational program. From a review of the courses available to students, there are a variety of courses available to meet mathematics and science requirements, depending on the students' interests and abilities. Vocational education course enrollments doubled over the last three years through recruitment efforts by teachers and the expressed belief by counselors and administrators that students need vocational programs as well as the academics, whether they are going on to college or not. It was felt that students should have some type of vocational program study to fall back on. The increased state graduation requirements passed in 1983, including the option to use vocational education to meet a mathematics or science requirement, were adopted and implemented very smoothly in the district. The curriculum of vocational education programs, which includes all traditional areas except agriculture, have been updated and are being restructured to implement competency-based instruction as is being advocated by the State education agency.

An interesting activity in the Fredericksburg Schools is the development of a gift program which includes areas in vocational education. Fredericksburg schools will be the site of the 1987 Governor's School for Students Certified in Vocational Skills. The objectives of the Governor's School will be to (a) provide an opportunity for students gifted or potentially gifted in vocational/technical education or related areas to explore career opportunities; (b) demonstrate the level of training possible from a partnership of vocational, general, and gifted education; (c) pioneer a model for development of the concept of giftedness in vocational/technical areas; (d) demonstrate the role of creativity in the vocational/technical areas; and (e) provide inservice for personnel participating in the program.

CHAPTER 5

POLICY ISSUES AND OPTIONS

The first purpose of this study, identification and description of high schools in Minnesota and other states where vocational education courses are being used to meet high school graduation requirements, was addressed in the previous chapter. In this section, attention is turned to the other two purposes of the study: (a) defining policy issues which need to be addressed in increasing vocational education's role in meeting high school graduation requirements, and (b) describing alternative resolutions to these policy issues as they exist or are being developed.

As the advisory committee for this study met to review and discuss the study's purpose and overall design, these major questions arose: (a) What should be the content of high school graduation requirements; (b) Should optional ways of meeting graduation requirements be allowed, encouraged, required; and (c) Should vocational education be used to meet some of the requirements as they stand today? This exploratory study investigated school sites where the response to the third question, should vocational education be used to meet some of the graduation requirements, is affirmative. The goal was to learn what policy issues needed to be grappled with in these sites because of their affirmative stance. Hopefully, the findings of this investigation will provide contextual information which will help to understand how the selected states and school sites are addressing the relationship between vocational education and graduation requirements and, in the process, provide insights into how other schools might deal with this relationship and the ways in which state level policy might direct the relationship. Overall, the analysis may provide additional considerations for addressing the major questions raised by the advisory committee as noted above.

What follows in this section is an analysis of policy issues and options under the categories (a) motivation, (b) relationships, (c) procedures, (d) barriers and facilitators, and (e) consequences. These categories were developed through reading and discussing the transcripts of interviews, observations, and other materials gathered in the course of the study. The categories are nonetheless arbitrary and emerged from several earlier drafts of categories and preliminary analysis of the data. Standing as background to the analysis and resulting categories are the ideas, experiences and theories described in Chapter 2, entitled Review of Literature.

Motivation

There were a wide range of responses given at the school and state level for allowing and encouraging the use of vocational education to meet high school graduation requirements. The policy issues of focus here are: Should vocational education be used to meet existing high school graduation requirements? For the schools we investigated, the response was "yes" and what follows are the reasons given for this response. Missing from this analysis are the reasons which would be given for responding, "no," since school sites giving these responses were not investigated in this study. Therefore, only half of the full story for policy direction is presented here. Attention now turns to the motivations or reasons given for allowing vocational education to meet what are sometimes termed "academic" graduation requirements.

Meeting Student Needs

The most frequent reason for using vocational education to meet graduation requirements was that this policy insures that the school system is meeting real student needs. This motivation is explained in the following ways:

1. It allows students to get what they need. Those who want to go on to college will get the biology and chemistry and physics anyway. (Counselor)

2. We have to think about what's best for the students. About what they need. (Vocational Director)

3. It (vocational education as option to meet graduation requirements) seemed to make sense for kids. And that was basically the basis of the decision. (Counselor)

4. It hasn't grown out of any strong demand for it. I think it's been a perceived need, at least on my part, that we need some kind of programs like that for the students. (Counselor)

5. That was one of those things where they were looking for other ways for that to be suited for the kids so that the whole audience of needs of the kids could be met. Due to considerations with the staff, looking at the kids, the needs of the kids. That was the thing we talked about. (Vocational Director)

Enhancing Learning of Basic Skills

A second frequent response for encouraging the use of vocational education to meet graduation requirements was that learning accomplished in vocational education served to enhance competence in the basic skills addressed by graduation requirements. Words to this effect were as follows:

1. It helps the students learn the basic skills by applying, which is our whole goal, and is our goal of equivalency crediting. (Vocational Director)

2. And so that's what really gave us the impetus that we had to turn out a person who was not only skilled with the hands, but skilled with the mind. (Vocational State Staff)

3. I think there was the foresight that, hey, there is information here (in vocational education courses) that should and could count (toward graduation requirements) and so I think there was just some forward thinking. (Vocational Director)

4. Because I feel, and this is how vocational teachers feel, that their vocational programs are really science and math oriented. They're applying science and mathematics. (Vocational Director)

5. In the process of implementing the first year being a pilot site, the superintendent, who was well aware of what was going on said, "Hey, there's a lot of science here (in a particular vocational education course). There's also a lot of math." (Vocational Director)

A state vocational director pointed out a particularly diabolical statement he had recently heard which concerns the role of vocational education in enhancing the learning of basic skills. The statement was, "The public at large is blaming vocational education because the students aren't skilled in academics. When in fact, the students are in vocational education because they're not skilled in academics." In effect, vocational education is sometimes viewed as a last resort to learn basic skills when more traditional academic options have failed for students.

Reducing Drop-out Rates

Although it was noted that there was not "hard" data on the impact of increased academic graduation requirements on high school drop-out rates, the feeling that drop-out rates were increasing nonetheless existed with some of those interviewed. The point made was that vocational education's use as an optional way of meeting graduation requirements might keep some students in school and, therefore, was a motivation for implementing a policy of the kind. One vocational director stated:

> The biggest change that I've seen (in response to increased graduation requirements),...I mean it's big enough to scare you. And these kids, we check each one, "Why are you leaving?" In some cases, they have to go back home (from vocational center) to pick up an extra credit to graduate; most of them are quitting school. Imagine this, senior year, because of those stupid requirements. There's kids that got math requirements, that never in this world, are not going to, I won't say they couldn't but they're not going to, they're just going to say, "The heck with it. I don't see it's relevant."

Another vocational director emphasized this motivation for using vocational education to meet graduation requirements, stating it was worth the policy in her school "even if we save two or three of them (drop-outs) a year."

Providing Alternatives For Special Needs Students

Both vocational directors and counselors noted that, for special needs learners, the provision of being able to use vocational education to meet graduation requirements provides added flexibility in programming and suiting the learning environment and approach to special student needs. The reason given for allowing graduation credits in these situations was rationalized as follows by a vocational director:

> Because some of the students were having trouble meeting requirements, and if they had taken general math and had failed it, and then come into a vocational program and were able to pick it up, we felt that here's a student who learns better, because now all of a sudden he realizes the need for math and he actually accomplished the math curriculum. So he should be given credit for it.

A superintendent saw the use of vocational education to meet graduation requirements for "special cases" in commenting:

> I think that it (vocational education) was used on those occasions where a student maybe failed two courses and all of a sudden found that he was a quarter or semester short. And that's when they started looking at it as a strong alternative.

However, another vocational director saw at least one dilemma in this line of reasoning. She notes:

> Frankly, the science department was looking for a way out of those kids... and it's not only the special ed. kids who don't do so badly (in vocational education courses)...it's a lot of kids who are on drugs, and drop-outs and that kind of thing, that nobody else wants to deal with.

Her concern is that if vocational education begins to rationalize its role in helping students meet academic graduation requirements by its attention to special needs students, then vocational education will lose its image of being able to do this for all students--of being academically rigorous. One way around this issue for handicapped students with IEP's is that vocational education can be used to meet the graduation requirements if this is a part of the IEP without having this option as a general policy for all students.

Providing More Options to All Students

Another motivation for using vocational education to meet graduation requirements revolved around the aim of giving students optional ways of meeting requirements. Related concerns were maintaining flexibility for student program planning and providing a comprehensive educational program for students to choose from. As a vocational teacher describes the situation, flexibility and choice in programming is very tight with increasing academic requirements:

> Forty-two percent of our graduating class in agriculture go back to the farm. It has been for the last 20 years. It varies a couple percent a year. So there you have those four kids out of ten who are going back to the farm that want placement, they want your production class, they want your mechanics class. They are booked in three hours a day to start with. They only have seven. So when they get to English and their social, they're already booked in five. And they got to get a physical education and some other things. Math is there, too. So they are probably booked in six right away. No options at all for band and choir. Those other things.

This same teacher went on to say:

> Whenever we put in another requirement, that hurts some kids who have a definite goal in mind. And as far as I am concerned, most things that come into our school system, new requirements, are for the college-bound kids. Not for all the kids in the high school. And that's not fair. I'm not knocking college-bound kids because I went through the process. And I was treated very well in high school. They encouraged me. If you take this and this and this, and I still got my classes in. That's why I'm teaching ag now.

> They watched out for me. But they also watched out for my buddies who didn't go to school.

A principal seemed to be confronting this same dilemma in stating:

> If you're going to have a lot of requirements, but we have a heck of a diverse kid population here. For some kids, it's going to be real tough to take two extra credits of science beyond the ninth grade. You know, biology or physiology, or something like that. We just need to be able to provide some alternatives.

A counselor in another school noted:

> The waiving of the graduation requirement (using vocational education as a substitute) was sort of an incentive for the kids who wanted to plan to get into those 3-hour blocks (of vocational education). That is because of the vocational requirements that we have, we're only on a six-period day, and so if the kids were to fulfill, say the math and science requirements and then try to find room in planning a three-year schedule to fit in all the other requirements, it would be very difficult.

Several school personnel commented that this scheduling problem is further compounded if students needed to travel to a vocational center to take vocational education, and thereby lost further learning time in transit.

In some cases, the need to provide alternative ways of meeting graduation requirements was not based so much on student considerations as on the available teaching staff. As noted by a principal, the reason for using vocational education to meet graduation requirements was "...probably administratively initiated. We just felt we probably didn't have enough math courses to meet the requirements." Another school's vocational director stated that the motivation was, "we don't have enough science teachers, and we could not have met all the requirements without some equivalencies." In another school, the motivation was administrative, but more personal: "He (the superintendent) had a real soft point in his heart for vocational education and so I think he felt real strongly about the virtues of it (the arrangement to allow academic credit for vocational education)."

The aim of providing flexibility in programming was cited as an important motivation for passage of policy by the legislature in one state encouraging the provision for optional ways to meet increasing graduation requirements, including the use of vocational education. A teacher comments on his testimony before the legislature as follows:

> The vocational educational folks essentially were not in opposition to increasing the amount of language arts or math program or the science program. What they testified for was to maintain sufficient flexibility that a sizable block of time could be pulled together, was appropriate for a student so that they could get into intensive vocational training. So it was more of a flexibility situation that a lot of the testimony focused on, than it was trying to keep from strengthening academic standards.

A related aim or motivation was providing students with a comprehensive education which avoided forcing students needing to make a choice between vocational education and graduation. A vocational director made this motivation clear in stating:

> When we got into them, we could see that the increased graduation requirements were going to make it more difficult for students to be able to take both programs (academic and vocational). So we tried to figure out a way that we could make it possible for students to be able to take both and meet some of the high school requirements. That's what equivalency credit is all about.

Preserving Role for Vocational Education

In addition to the motivations noted above, another concern voiced by some of those interviewed was preserving a role for vocational education in the secondary school and thereby for vocational education teachers and administration; more frankly, the issue of job security. The thinking seemed to be that increasing graduation requirements with a fixed length of school day would mean declining enrollment in vocational education, and subsequently a decline in the number of vocational education teachers and administration. A state vocational education administrator put it this way:

> When the national studies started to come out, and we saw what they were suggesting, it was our decision we had to do something because of things that were pressuring for more academics. Plus, at the same time, we had an increased emphasis on graduation requirements in the state, an extra math was added, and those are just minimum, because many of the school districts were adding more than the minimum. So there was a push towards academics in the state. The State Department of Education was pushing for more academics. We had an articulation study with the colleges in looking to see what we could do to improve the ability of the students entering the colleges, and naturally, that was pushing for more academics. And, of course, the business and industry, saying "You need to strengthen basic skills." So all of those combined.

The fear was that vocational education was going to lose a substantial number of students and teachers in this context. State leadership in vocational education viewed a viable strategy as:

> Make vocational education more accessible, and get students out of the mode where they have to make a choice between vocational education and graduation.

The vocational education administrator goes on to note as a result of implementing this strategy that:

> It very well may be that there will be an increased demand for vocational programs, which will enhance the job security of many vocational teachers.

However, the motivation associated with job security, albeit natural, needs to be kept in perspective. A curricular coordinator speaking to this issue stated:

> If we don't have a program like this (policy of using vocational education to meet graduation requirements), those kids might not be around to take your course (academic subject) in the first place, or second place or third place, whatever it happens to be. So I can say the same thing for social studies. People are worried about the twelfth-grade requirement. If we got to that kind of discussion, let's say if we don't have this program for this kid in twelfth grade he might just decide to say goodbye after grade 10 or 11. That's the other side of the coin. I am much more concerned about the welfare of the students than I am about the welfare of the teachers. It gets me in a lot of hot water. But that's not all of the teachers, or even a large number of teachers. It's a pretty small minority.

Looking to the Needs of the 1990s

Only one of the states noted that an important source of their motivation for using vocational education to meet academic graduation requirements was a look to the nature of work and education in the longer term future. As a state vocational education administrator in this state put it:

> This whole impetus got started by bringing the program leadership of the division together and saying, "Okay, where do we want to be by 1990?"

This perspective was motivated by the report of a state education task force report which stated that vocational education was the preparation for entry level employment and a lifetime of work.

The state administrator pointed out, "It's that second part that we picked up on, 'and a lifetime of work'."

Relationships

The major questions guiding this section of the analysis of findings was, "What should be the relationship between vocational education and high school graduation requirements?" We were looking for the precise words used to describe the relationship as a way to get an idea of what was really meant when vocational education courses were being used to meet graduation requirements. What we found was the use of a wide variety of terms, sometimes interchangeably. Each term has a slightly different connotation in ordinary language use. The terms we found being used were:

1. Equivalency crediting
2. Cross-crediting
3. Academic credit for vocational courses
4. In lieu of
5. Waiver
6. Alternative
7. Exemption
8. Option
9. Substitution
10. Applied academics/practical academics
11. Counts for

On probing for the meaning behind these terms, little in the way of in-depth rationale was found for the choice of a particular term. More concern was expressed, however, for the need for choice of one term to describe the relationship and the consistent use of that term by everyone involved. As is apparent, some of the terms (i.e., option, equivalence) imply a more equal relationship between vocational education and other more commonly used courses to meet graduation requirements than other terms (i.e., in lieu of, substitution, counts for).

Process of Relating

Next we turn to the process used to relate vocational education to high school graduation requirements. Essentially, we were seeking a response to the policy question, "How should the relationship be developed and implemented?" In presenting the results of analysis, the process is subdivided into the following components and related policy issues:

1. Appraisal -- How should the contribution of vocational education to meeting requirements be appraised?

2. Staffing -- How should the competence of vocational education teachers to teach the content of the requirements be ensured?

3. Monitoring -- How should the contribution of vocational education to meeting requirements be monitored once approved?
4. Publicizing -- How should the role of vocational education in meeting requirements be publicized?

5. Funding -- Should categorical vocational education funds be used to maintain and enhance the role of vocational education in meeting requirements?

6. State role -- What should be the state education agency's role in facilitating the relationship between vocational education and high school graduation requirements?

Each of these process components and their related policy questions will now be addressed.

Appraisal

How should the contribution of vocational education in meeting graduation requirements be appraised? First, it is important to realize that high school graduation requirements exist at both the state and local school levels. Local school requirements must at least meet the minimum state level requirements and may exceed the state's requirements.

All of the states we studied left it up to local school districts to finally decide the extent to which specific vocational education courses would meet graduation requirements, both state and local. The specific content of the related policy in Washington was as follows:

> The content of courses and the determination of which courses satisfy particular subject area requirements and whether a particular course may satisfy more than one subject area requirement for different students shall be determined locally in accordance with rules adopted by boards of directors of districts. (WAC 180-51-025)

The process of appraisal varied from very informal to more elaborate formal processes with several steps, all described in local school policies. The more informal process was described by a principal in one of the states as "...trying to make sure that everybody has some input and everybody understands it and finally we have a consensus on it." A more concrete process described by a superintendent in another school district in the same state related the following process in gaining credit toward graduation requirements for vocational agriculture:

> The agriculture curriculum was reviewed by the principal and by the science teachers or the math teachers, whichever we're looking at, whatever credit was being considered. Then it was just a matter of negotiation between the ag people and the science or math people. And when agreement was reached, then it was recommended to the board and adopted.

As an example of the more formal appraisal process, see Exhibit 1 used in the Kent school district in Washington. The result of the appraisal process might be put in the form of a formal resolution as shown in Exhibit 2 for the principles of technology course in the Spring Lake Park district in Minnesota.

Exhibit 1
Example of Local School Policy Regarding Process for Obtaining Equivalency Credit for Vocational Education

---

Outline for Gaining Equivalency Credit

1. Identify objectives in your curriculum that are common to other classes such as math, science or English. Discuss the concept with other teachers and the building principal.

2. Determine the number of hours spent in teaching or application of these common objectives. These hours should be in units equal to the appropriate credit requests.

3. Discuss the request with the appropriate teachers in your building to get their approval.

4. Present the request to the appropriate district instructional committee with copies of your course objectives highlighting those that are in common with the class for which equivalency credit is requested.

5. Present the request to the Instructional Council through the Vocational Education Representative. (Backing of the instructional committee for the class with which the equivalency credit is requested is absolutely necessary to gain I.C. approval.)

In most cases, the appraisal process was initiated by vocational education teachers seeking credit toward graduation

Exhibit 2
Example of School Board Resolution Authorizing Use of Vocational Education Course to Meet Academic Graduation Requirement

RESOLUTION

WHEREAS the Board of Education is committed to enhancing the quality of the curriculum and instruction provided by Independent School District No. 16; and

WHEREAS the Board of Education is particularly concerned that the District's programs bridge the gap between academic and vocational courses to prepare children and youth for work in a world impacted daily by new and emerging technologies; and

WHEREAS educational quality is significantly determined by the extent to which subject matter is presented to students in a form and manner that makes it more meaningful and significant to them; and

WHEREAS these objectives are being met in a superior fashion through Principles of Technology, a course in applied science currently offered at Spring Lake Park Senior High School; and

WHEREAS Principles of Technology (a) stresses the importance of learning technical principles that undergird the industrial world of technology; (b) encourages the improvement of mathematical skills and their applications needed by technicians; and (c) emphasizes the importance of continual hands-on laboratory practice in a vocational setting; and

WHEREAS Principles of Technology is conceived, developed and written for the vocational student, designed to be sensitive to his or her needs and goals; and

WHEREAS Principles of Technology is also a most appropriate course offering for secondary students as a whole in that the course effectively bridges the gap between academic and vocational courses in the high school; now, therefore be it

RESOLVED that senior high school science credits shall be considered earned and duly awarded to any and all students attending Spring Lake Park Senior High School who successfully complete the requirements as set forth for the course, Principles of Technology.

requirements for their courses. From this request, usually to an administrator, the process moves to some form of appraisal. As described by a vocational director the appraisal entails, "...how you're teaching it and how much are you teaching it." The actual appraisal might be very global, involving the "eye balling" of course outlines or be a much more specific appraisal of the course objectives and content and the amount of time spent on each objective. The more elaborate appraisal usually involved an analysis of the vocational education course in question to see what academic content was taught (i.e., mathematics, science) or the comparison of the content of the vocational education course with the content of the academic course for which it was to be an alternative or substitute or equivalent. In the first process it was only necessary to document (a) that academic skills (i.e., mathematic) were addressed, and (b) the number of hours spent on these skills in order to arrive at the amount of academic credit to be given (i.e., 1, 1/2, 1/4). One of the states we studied had decided to advise local schools not to give partial credits -- either a full year credit should be given (equivalent to 120 hours) or nothing at all. See Exhibit 3 for an example of the format used to establish the "academic" learning content of vocational courses in the Puyallup school district of Washington.

In the second type of appraisal, analysis focused more attention on the specific type and/or level of academic skills addressed in the vocational education course. Exhibit 4 shows a sample of the types of equivalencies that were in place in Washington in 1985.

There is often variation between local school districts in the same state. As one state vocational education official described:

> What some districts have done is to...have the instructors spell out all of the math competencies or the English competencies and identify what those are. And the number of instructional hours...they wanted to have 60 instructional hours for credit. Now another district will simply say, okay, we'll allow Ag to meet this requirement.

In all cases, our informants noted that the process worked much better to the extent that the teachers involved knew and respected each other.

The point was made that the process worked best when teachers would sit down together (vocational and academic) and actually talk through the appraisal process. Experience had shown that trying to compare courses, competence for competence on paper, was not an easy process. If the teachers talked, they often brought in additional concerns and the process, if positive, resulted in closer working relationships.

Exhibit 3

Example of Process Used to Related Content of General Science Course to Vocational Education Courses Titled National Resources, Horticulture, Forestry

	Nat. Res.		Hort.		Forestry	
General science goals	I	II	I	II	I	II
Learning opportunities provided shall assist in acquiring and developing:						
Values for science as a way of learning and relating to self, others and the environment.	x	x	x	x	x	x
Ability to use scientific problem-solving and inquiry processes	x	x	x	x	x	x
Ability to use the conventional language, instruments and operations of science	x	x	x	x	x	x
Knowledge of significant scientific assumptions, theories, principles, laws, facts and their cultural and historical contexts	x	x	x	x	x	x
Ability to use scientific knowledge, processes and conventions to clarify values, examine issues, solve personal and social problems and to satisfy personal curiosity	x	x	x	x	x	x
Understanding of the relationship of science learnings to the planning and fulfilling of personal, social and career life roles	x	x	x	x	x	x
Values for science for its aesthetic contributions	x	x	x	x	x	x
Ability to initiate personally novel ideas related to science	x	x	x	x	x	x
Confidence in their right to develop, hold or express conventional or unusual ideas related to science	x	x	x	x	x	x

Exhibit 4
Examples of Equivalencies Between Vocational Education Courses and Academic Courses Required for Graduation

Vocational area:	Equivalency offered by one or more districts in:	
Agriculture	Mathematics	2
	Science	49
Business education	English	48
	Mathematics	40
	Social Studies	5
Health occupations	Health	6
	Science	3
Home economics	Health	7
	Mathematics	3
	Social Studies	2
	Physical Education	2
Marketing	Mathematics	1
	Social Studies	1
Trade and Industry	English	1
	Math	8
	Science	12

Switching point of view, here is another look at the findings:

Equivalency available	Vocational program and number of districts offering credit	
Science	Agriculture	49
	Trade and industry	12
	Health occupations	3
English	Business education	48
	Trade and industry	1
Mathematics	Business education	40
	Trade and industry	8
	Home economics	3
	Agriculture	2
	Marketing	1

Health	Home economics	7
	Health occupations	6
Social studies	Business education	5
	Home economics	2
	Marketing	1
Physical education	Home economics	2

Source: Yakima Valley Vocational Skills Center and Northwestern Regional Education Laboratory. (1986). Options for equivalency credit in high school curriculum, Seattle, WA: Washington State Commission for Vocational Education.

Most informants noted that the process of appraisal was getting more formal over time and it was becoming more difficult to obtain approval for vocational education courses in meeting graduation requirements with the coming of the recent round of school reforms and as more vocational education courses are approved for this purpose. As a vocational director noted, "...it was such an informal thing, in the past. You'd just be able to do it without ever adding totals". Another vocational director said "...we had done equivalency crediting for a long time, and it was actually easier before than it is now. Now we have to fight like everything to get one equivalency."

Staffing

The major policy question with respect to staffing as it pertains to the use of vocational education courses in meeting graduation requirements was that of licensing. Specifically, "should vocational teachers be required to be licensed in the academic subject matter area (i.e., mathematics, science, communications) before the vocational courses they teach are allowed to be used to meet graduation requirements?" The response varied by state. In Washington and Virginia, specific licensure in an academic area is not required. The perspective was that vocational teachers had sufficient academic preparation as part of preparation for their vocational education licensure. At the time of the study, some question was being raised in Washington about continuing this policy for those teaching vocational education who did not have baccalaureate degrees. In the latter case, a state level vocational administrator noted that the rationale being used to justify contribution of academic credit was, "...we're trying to say that persons (non-degreed teachers) are not teaching math, but that the subject matter includes a good deal of math, which can meet that math requirement of they're willing to look at what math concepts are taught."

In Minnesota, licensure in academic areas was required for courses used to meet state graduation requirements. For local school requirements beyond those of the state level, the licensure issue was up to local school resolution. One superintendent in Minnesota noted that it was possible to obtain exceptions for teachers without licensure in academic areas. His view was, "The licensure laws were basically written to protect children. They were not written to prohibit creativity in serving children better ... You can get exceptions to almost anything if you go through the steps of proposing your exception."

This school dealt with the issue by having a vocational education course which was to qualify for a science credit taught under a cooperative arrangement between an industrial and science teacher. In other cases, vocational education teachers were found who also qualified for an academic subject teaching license or had (as in the case of Washington) an added endorsement in an academic subject area. An endorsement required 24 credit hours of instruction in the specific subject area. As noted by a vocational teacher, an interesting situation could develop, "...if you end up with a class that is science for half of the kids and vocational education for half of the kids, which certification process would fit?"

A state level vocational administrator in another state raised concern about the ability of vocational education teachers to teach academic courses, saying, "I think a real test is to ask the question whether vocational teachers can really teach mathematics." At another point in interviewing him on this matter he went on to say, "...we feel that we've been kidding ourselves if we thought our vocational teachers were really teaching very much math or science or communications." His explanation was that:

> They (vocational teachers) would teach for the task at hand, particularly in math. If they had to have a little bit of math for that particular test in the lab that day, they taught it just for that immediate purpose, but did not have the underlying principles that allow the student to make application to other tasks.

The strategy adopted in this state was to hire academic teachers to teach applied mathematics, science and communication with appropriate in-service training rather than use vocational education teachers to teach these courses or seek approval to use vocational courses for academic graduation requirements. Their approach was described as follows:

> We have elected to keep the vocational teachers in the classroom while the math, communications and science is

> being taught. We don't want to give it the name "team teaching" and fall short of what good team teaching is. But we keep them there for three reasons: One, those vocational teachers certainly were very much threatened by what was happening and we heard horror stories from every corner on that. Also, because we recognized early on that vocational teachers need the learning, too -- that many of them were very weak in math, communications and science skills and what better way for them to learn than along with the kids. And third, because we thought it was important that these not be in separate classes. That rather than sending vocational kids out to a math class, that we would bring the math teacher in and say "and now our class is having math."

Monitoring

As noted by a vocational director in one of the schools we studied, once vocational education courses are approved to meet academic graduation requirements, the next concern is "...keeping it, making sure the teachers don't change their curriculum, and trust they are doing what they said, and as staff changes that's more and more difficult to monitor." This issue of how continued assurance should be made of necessary coverage of academic skills after initial approval was dealt with in a variety of ways.

As described by a counselor in one of the schools where vocational agriculture was being granted science credit, the monitoring process was occurring as part of a review of all of the curriculum in the school.

> Right now the total curriculum is being reviewed and learner outcomes or competencies are being listed for every course. They began last year with three courses and this year have been doing three more reviews. Science and agriculture were two of those courses reviewed this year. It had to be approved by a Program Evaluation Review Committee and by the secondary curriculum committee made up of teachers and parents and administrators and school board members.

In the state using academic teachers to teach applied academics, monitoring was also thought to be very important, in this case to keep the applied academic courses with an emphasis on the applied. A state level educator noted, "...if any state is going to move in this direction (having applied academic courses) they must have coordination time (between academic and vocational) in order to keep track that math is applied to the vocational area. Otherwise the math teacher will go back to the teaching of math out of the book." They have adopted a system calling for submission of a detailed course of study including a description of correlation between academic and vocational content, and in some schools, weekly review of lesson plans. An example of the correlation chart is shown in Exhibit 5.

Publicizing

Informing all of the relevant parties about the relationship between vocational education courses and graduation requirements was found to be important if the relationship was to be used. The groups to be informed, which were identified in interviews with the sites studied, included students, parents, school administrators, other teachers, counselors and school board members. Where state policies were concerned, the groups to be informed included all state education agency officials. Where the relationship involved implication for students seeking postsecondary education, it was also noted that postsecondary institutions needed to be informed. In some cases, the publicizing process for postsecondary institutions went to the more formal stage of having clearly described articulation agreements between secondary and postsecondary institutions signed by both parties and detailing credit transfer policies.

A variety of formats or mechanisms were identified as being used for publicizing purposes. A common format was to provide the information about a vocational education course's relationship to graduation requirements in student registration materials as shown in Exhibit 6. Other mechanisms included official memorandum, in-person visits to classes (such as the English classes where all students would be contacted), newspapers, and special marketing materials such as brochures and videotapes. State personnel in one of the states pointed out the importance and benefits of using pilot projects to tryout and communicate statewide policy changes in very effective ways.

Funding

Should vocational education categorical aid be used to facilitate the relation of vocational education courses to graduation requirements? We found two ways in which vocational funds were specifically used in this way among the states we studied. In Washington, the state had contracted with an outside agency to develop a guide to assist local schools in working out equivalency credits or cross-crediting for vocational education and subject matter areas covered by graduation requirements. Along with the guide (see Exhibit 7 for Table of Contents), the outside contractor also provided a series of regional workshops in the state to train local school staff (usually administrators) how to guide the process in a local school.

In Ohio, where the concept of applied academic teachers was being implemented to increase the academic content of vocational education programs, vocational funds were used directly to pay the salaries of the applied academic instructors. An important

Exhibit 5

Example of Correlation Chart Showing Relation Between Vocational and Academic Courses in an Area Vocational Secondary Center

VOCATIONAL		ACADEMIC	
Auto Mechanics Objectives	Auto Mechanics Activities	Communication Activities	Communication Objectives
Unit: Service Brake Systems (4 weeks) Given various brake system components, equipment, tools, materials, instructions, and the observance of all safety precautions, the student will disassemble, diagnose, overhaul, and reassemble components in accordance with manufacturer's specifications and stipulated operable conditions. All machining operations must be acceptable to industry finishes and tolerance. All vehicle brake systems will be restored to a safe operable condition according to industry standards and instructor's satisfaction.	Remove and replace drums. Inspect brake lining, drums, and hardware. Check and inspect hydraulic system. Recondition drums. Check the operation of parking brake. Service and/or replace parking brake components. Replace steel brake lines and/or fittings. Cut, bend, and double flare steel brake lines. Bleed brakes manually. Bleed brakes with pressure bleeder. Remove and replace brake shoes. Adjust brakes. Remove and rebuild sliding calipers. Remove and rebuild floating calipers. Inspect and recondition rotors. Repack wheel bearings.	Study Motor Auto Repair Manual sections on disc brakes. Take quizzes on vocabulary, interpreting diagrams, and following directions. With a study guide, read and discuss Occupational Safety and Health Act (DSHA) (standards, enforcement, results, implications) With the help of the Reader's Guide, locate, read and discuss articles in periodicals on seat belt legislation, air bags, and other measures to cut down on serious injuries and/or accidents. Read and discuss the following poems:	Read, interpret, discuss, and apply information--including charts and diagrams. Learn and practice library skills: Locate information in Reader's Guide to Periodical Literature. Read and analyze articles in periodicals and newspapers. Read and discuss various types of poems and short stories. Write poems and/or short stories by following the steps of the writing process. Develop and apply listening, note taking, and evaluation skills.

Exhibit 5 (continued)	Remove and replace wheel bearing. Test and replace power boosters. Remove and replace brake system control valves. Overhaul wheel cylinder. Remove and replace master cylinder. Flush brake system.	"Southbound on the Freeway" by May Swenson "The Scarred Girl" by James Dickey "Highway: Michigan" by Theodore Roethke "Traveling Through the Dark" by William Stafford "The Flat" by Laurence Lieberman "Model T" by Adrien Stoutenberg "Auto Wreck" by Karl Shapiro Write poems about cars and/or accidents. Listen and take notes on a presentation by a state highway patrolman, a sheriff's deputy, and a police officer on accidents and accident prevention. In groups of 3 students, survey the accident reports and articles in a week. (Each group will study a different newspaper.) Prepare a report which summarizes locations, times of day, days of the week, causes, ages of drivers, injuries, deaths, and other pertinent conditions.	Organize information and present an oral report or multi-media presentation. Practice peer response activities (poems, stories, and oral reports and presentations).

Exhibit 5 (continued)

Present the report to the rest of the class in one of the following ways:

Panel discussion;
From different points of view:
  - TV or newspaper reporter
  - Wrecker driver
  - Hospital emergency room
  - Nurse or physician
  - State highway patrolman or police officer
  - Driver or passenger involved in an accident

Source: Ohio Department of Education, Division of Vocational and Career Education, Columbus, Ohio.

Exhibit 6
Example of Publicizing Relationship Between Vocational Education Courses and Graduation Requirements in Student Registration Booklet

GRADUATION REQUIREMENTS

Farmington Senior High School is a four-year high school with courses organized on a semester basis. Each semester course, when successfully completed by the student, has a credit value of one.

1. A minimum of 46 (forty-six) semester credits earned in Grades 9 through 12 is required for graduation.

2. Specifically, the following numbers of semester credits in various subject areas in Grades 9 through 12 are necessary for graduation:

A. English - Eight (8) semester credits. Read carefully the specific English Department requirements on pages 29-32.

B. Social Studies - Eight (8) semester credits. Read carefully the specific Social Studies Department requirements on pages 54-56.

C. Physical Education - Four (4) semester credits. Two credits must be taken in Grade 9 and two in Grades 10, 11, or 12.

D. Health - One (1) semester credit. This course should be taken in Grade 10 or 11.

E. Science - Four (4) semester credits. Two credits must be taken in Grade 9. Two credits must be taken in Grades 10, 11 or 12. The two credits required beyond the 9th grade can be earned in Chemistry, Physics or Biology OR by taking two credits in the following courses:

> Agriculture - Plant and Soil Science, Horticulture, Landscaping, Animal Science or Natural Resources.
> Industrial Arts - Electricity or Electronics.
> Home Economics - Child Growth and Development, People and Food,
> Food for Life or Food Service - Occupational.

F. Mathematics - Three (3) semester credits. Two credits must be taken in Grade 9. One credit must be taken in Grades 10, 11 or 12. All upper level mathematics courses can be used to meet this requirement. The one credit required beyond the 9th grade can be earned also by taking one of the following courses:

Agriculture - Agriculture Business Management
Business - Business Mathematics or Accounting II

G. Electives - Eighteen (18)

---

stipulation that made implementation more controversial was that the overall funding for vocational education was not increased. Rather, applied academic instructors replaced vocational instructors and the funding formula moved from the teacher as the basic unit (with state funds used to pay a portion of the teachers salary) to an instructional unit which was developed around optional program configurations of vocational and applied academic instruction.

State Role

In several sites, specific note was made at both the local and state level of the role of the state education agency in facilitating the use of vocational education to meet graduation requirements. After review of the study findings, the role of the state agency was subdivided into the following categories: (a) Initiation and leadership, (b) policy interpretation and granting exceptions, (c) appraisal of curriculum (to determine coverage of graduation requirements), (d) formulation of guidelines and standards, (e) in-service education, and (f) marketing of arrangements. Each of these categories of the state's role will now be described more fully.

Initiation and Leadership

As one state agency official noted, she saw the state's role as "providing options and processes for bringing (them) about." In this state, the state vocational education agency staff had selected the theme "transitioning to the twenty-first century," which they were going to carry forward for the next 3 to 5 years, recognizing that a slow, continuous process of change was necessary to keep current. The use of vocational education to meet academic graduation requirements and the changes this option implied for the content of vocational education was a part of the changes that were being advocated.

Sometimes our informants presented the leadership option quite abruptly. One state level official stated that the top state education administrator simply advised the vocational education agency staff that "you can either sit back and complain about the fact that they (state academic graduation requirements)

Exhibit 7
Table of Contents of Guide to Assist Local Administrator in Relating Vocational Education to Graduation Requirements

CONTENTS

Page

I. Introduction 1

II. How to Develop a Plan for Awarding Equivalent Credit 2

III. Questions People Will Ask 9

- A. Who should take the lead in initiating equivalent credit discussions? 9
- B. What about teacher certification issues? 9
- C. Will colleges and universities accept equivalent credit? 10
- D. What are some ways to report equivalent credit on the transcript? 11
- E. What are some assessment and testing issues we need to consider? 11
- F. What does all this do to the time teachers have to spend? 11
- G. What kinds of staff development are needed for this activity? 12
- H. Are there some scheduling implications we need to know about? 12
- I. What about additional space, personnel and materials costs? 12

IV. Resources to Consider 13

Source: Yakima Valley Vocational Skills Center and Northwestern Regional Educational Laboratory. (1986). Options for equivalency credit in the high school curriculum, Seattle, WA: Washington State Commission for Vocational Education.

were increasing or you can look at the potential and see how you can work with it." The state level official noted, "Immediately we took a proactive stance in developing program options."

In another state, a top state education official described the situation they faced when graduation requirements were faced as follows:

> We never had the opportunity to buck it, that decision was made before we ever got hot on this thing. There was a policy passed by the State Board that if credit was to be granted, the teacher had to be certified in the area for which credit was to be granted. So it seemed like a losing proposition and a waste of energy and effort to try to fight that.

Instead, the key leadership group of state agency officials went on a retreat to develop and analyze optional ways to keep vocational education vital and available to students with the new graduation requirements in place.

Policy Interpretation and Granting Exceptions

Another role of the state education agency was in making interpretations of state policy regarding graduation requirements and granting exceptions where appropriate as they would relate to vocational education courses. As a local school counselor in Minnesota related to us:

> We can't exempt (students) from the state requirements. There is some discussion going on (in our school system)...regarding the possibility of substituting some vocational credit for the state requirement in social studies 12, for example, which is basically a problems course which involves some personal finance type economics and those sort of things. But I don't believe unless the state would come out with some kind of a definitive directive in that regard, that we have the authority as a local school district to do that...Because whether I agreed or disagreed with the rationale, we would still need to get permission from the state to make those kinds of waivers.

Through policy interpretation and granting exceptions, the state agency can play a powerful role in communicating the state's perspective on the relationship of vocational education and graduation requirements.

However, most states allow considerable autonomy to local school districts in deciding how vocational education courses will relate to graduate requirements. For example, in Ohio, the point made was:

> There is no set curriculum guide or course of study in the State of Ohio. Some states do that. We do not. We say that's a local decision, that what goes into that course of study must meet their local needs.

In Washington, which has state policy providing for vocational education to be used to meet graduation requirements, the point made was:

> They (local school district boards) have the authority to do what they want to do ... They write it into a policy... They don't have to submit it to you (state agency) to get approval... districts determine what subjects (courses) will be within requirements... If you had a mandated state curriculum then you could sit here in this office (state education agency) and take the... mandated curriculums, and decide what's equivalent.

Appraisal of Curriculum

In two of the states we studied, the state agency played a significant role in appraisal of the vocational education curriculum to identify ways in which the content related to academic graduation requirements. In Virginia, the state agency prepared a guide which described the way in which academic requirements were addressed to each vocational education area (see Exhibit 8). This state had the beginning advantage of having very detailed curriculum guides for each vocational education area which included identifying specific competencies to be addressed in each course.

Exhibit 8

Example of State Level Guidelines for Using Vocational Education as an Alternative Way to Meet Graduation Requirements

---

HIGH SCHOOL GRADUATION REQUIREMENTS FOR OCCUPATIONAL HOME ECONOMICS

Home Economics Education is composed of Occupational Home Economics and Consumer and Homemaking Education. It is the occupational component of Home Economics Education that currently is affected by the new accreditation standards. The satisfactory completion of one of the sequences of courses listed below or of a specialized, senior-intensified program may serve as an acceptable alternative to one unit in mathematics or science in the 20-unit diploma, if approved by the local school division. A

Exhibit 8 (continued)

program completer in Occupational Home Economics is a student who fulfills the requirements for one of the following programs:

Child Care Occupations

Child Care I
Child Care II

Clothing Occupations

Clothing Occupations I
Clothing Occupations II

Food Occupations

Food Occupations I
Food Occupations II

Home Furnishings Occupations

Home Furnishings Occupations I
Home Furnishings Occupations II

Home and Institutional Occupations

Home and Institutional Services I
Home and Institutional Services II

Senior Intensified

Catering Specialist
Clothing Specialist

HIGH SCHOOL GRADUATION REQUIREMENTS FOR MARKETING EDUCATION

In order to provide students with maximum accessibility to Marketing Education (ME) within the framework of the new accreditation standards, several changes have been made to the present program:

1. A student enrolled in Marketing Education will be classified as program completer upon successful completion of one of the following options:

   - One 36-week ME course using the cooperative method

   - Two 36-week ME courses using the occupational experiences method.

Exhibit 8 (continued)

2. Completion of any two 36-week ME courses, with the exception of the sequence Fundamentals of Marketing and Fashion Merchandising I, will serve as an acceptable alternative to one credit in mathematics for a 20-unit diploma, if approved by the school division.

Source: Virginia Department of Education, (1986). A guide to vocational programs planning, Richmond, VA: Virginia Department of Education.

In Ohio, the movement to using applied academic teachers in area secondary vocational centers involved an extensive examination of the vocational curriculum from an academic perspective with state leadership and coordination. State agency officials described the process in the following way:

> ...we approached it from an intercurricular base and said okay, students are going to need these math skills, those math competencies are in our curriculum. Let's pull those out, and see what they look like, with the assistance of some academic consultants that had credibility with the academic community. And we were fortunate to get three good ones: A communications consultant; a math consultant; and a science consultant, and they helped us do that. Then packaged those with certain criteria or stipulations that as they were taught, they had to be tied very closely and show direct application to the occupational area.

Formulation of Guidelines and Standards

The state agency can play a strategic role in implementing a desired relationship between vocational education and graduation requirements through mandating particular characteristics in order to get state vocational education funding. In Ohio, these stipulations were described as follows:

> We controlled through funding. We also said, "if you want to participate in applied academics, both your academic and vocational teachers have to go through an in-service in the summer, and you have to submit a course of study, have it approved, not by us, but by elementary and secondary, for the academic, and you've got to submit a correlation chart showing how the principles you're teaching in the applied academic correlates to what the school is doing in the vocational department.

As noted, the course of study for applied academic courses must be approved by the elementary and secondary education sections in the state agency before it is approved for vocational funding. The reasoning was described as follows:

> Because once it's approved there, then that assures us that it's a substantial course. And then we look for the correlation (to the vocational area) which is our concern in vocational education... You will find that the math is more sequential, and you cannot correlate on a day-to-day basis because it's a building process with math. Compared to communications where you see pretty much a day-to-day flow back and forth.

A program approval form has been developed for use by local schools to assure that all the characteristics thought to be important by the state agency are in place for applied academic courses. The process was described as follows:

> We have an annual application for approval of programs. What we call the VE-21 form, and so the staff as they look for the certification of the teacher, as they look for the time commitments that must be there, they also look for the correlation time.

In order to be eligible for vocational funds the local schools have to commit to:

> One, is that they have to show direct application of the content (of the applied academic course) to the occupational area ... They have to submit a course of study. Second is, they have to show (the time schedule) ... correlation time between the academic and vocational teacher. It has to be structured correlation time. It can either be on a daily basis, or it can be so infrequently as on a weekly basis. With respect to the correlation planning time for the applied academic and vocational teacher, the state agency suggests 40 minutes a week. And we have pushed for scheduled time. Some of them are getting it before school starts. Some of the schools have a requirement that teachers have to be there 15 minutes before school starts, 15 minutes after school ends, and so they can get coordination time there. Some of them are doing it at lunch times. They'll schedule to eat together.

The next aspect of applied academic courses being addressed by the state agency is a move toward not letting schools group or cluster students from more than two of the vocational areas for the applied academic courses. The perspective being taken was:

> Can you do clustering? Can you have auto body and child care (students) in the same math class? What we say is that look at the course of study again, and determine to what extent those math principles are the same in auto body or child care. Now, off hand I'd say there's probably not too much correlation there. But we leave it up to the local district. We say, there are some stipulations that keep the class small. We say we want to have classes about 25, no more than that. We don't want a math class of 50 students. You get 50 students, you're going to cluster more in order to get that. So the class size keeps it down. The other thing is that we say that it must be directly related to the occupational areas and that keeps it down.

As can be seen in the above description, the state is exerting considerable leverage over the relationship between vocational education and graduation requirements through funding decisions.

Another example of the state role through use of guidelines was described by state agency personnel in Washington. The legislature in Washington has recently passed legislation calling for the development of model curriculum in all the educational program areas for public schools. During the current legislative session:

> ... they're adding an amendment to that (previous legislation) that requires the establishment of guidelines for vocational education or alternative courses to meet the graduation requirements in whole or in part. So what they are now doing is taking what was in place in the law and strengthening that by inserting it also into the model curriculum legislation which required that a part of their model curriculum will include guidelines for looking at vocational education or other courses.

In-Service Education

In all of the states outside Minnesota which were studied, an extensive program of in-service workshops was conducted by the state agency or external contractors to assist in implementing plans to relate vocational education and graduation requirements. In Washington, as already described, an external contractor was hired to provide the in-service workshops. The workshops involved local school district personnel responsible for the overall curriculum in schools along with vocational and academic teachers. Workshops were conducted in the various regions of the state, involving examination of various models for relating vocational education to graduation requirements and doing planning for individual school districts. A follow-up workshop was done the next year for vocational directors to deal with emerging issues such as the acceptance of vocational education courses to meet academic graduation requirements for students going on to school in colleges and universities.

In Ohio, workshops were conducted regionally in the state by the state vocational education staff. The workshops followed a prescribed format. After several workshops were conducted, a standard response booklet was prepared to answer the most frequently asked questions so as to make sure the responses were consistent, when different individuals were doing the workshops. A page from the booklet is shown as Exhibit 9. The workshop was attended by pairs of instructors from programs in the participating schools, the pair composed of an applied academic and vocational instructor. After the experience of a few workshops, the state agency personnel decided the most effective format was to break the pairs and first meet with each group separately and then bring them together for joint planning of curriculum. As noted by state staff, "We knew we couldn't do that in one day, but that (the workshop) was a direction-setting type of initiative that we wanted to extend back at the local level." In addition to in-service workshops, Ohio was encouraging vocational teachers to go back to school to pick up additional certification in an academic area and hiring of teachers who had strong academic preparation along with meeting vocational licensing requirements.

Exhibit 9

Example of Common Questions and Answers for Introducing New Structure of Program Options and Applied Academic Courses in Ohio's Secondary Area Vocational Centers

---

Course of Study

1. Q. What recommendations can be made to assure that adequate time is permitted for course of study development?

   A. Give teachers extended service prior to the starting of the school year.

      - Pay teachers for a specific number of work hours beyond standard contract requirements.
      - Develop teacher contracts on an 8-hour work day with six for teaching and two for daily planning and writing.
      - Phase in Program Options gradually to permit a vocational teacher to teach only one lab the first year, while writing, adjusting and working with the applied academic

Exhibit 9 (continued)

teacher during the 2nd lab time. The second year this vocational teacher would most likely teach the junior and senior vocational blocks.

2. Q. Who should be involved in course of study development?

   A. There must definitely be a local coordinator for courses of development to determine format, guidelines for working, timeliness, etc.

   In JVSDs, county boards of education curriculum staff persons must be involved since local school districts will be asked to grant academic credit to vocational students enrolled in Program Options.

   Involving local school district academic teachers on the applied academics advisory committee is worthy of consideration. It may be best to select the "best" local academic teacher as others will respect the choice or, in some instances, a local academic teacher who is a "foot dragger" in accepting applied academics may turn out to be a strong supporter.

   Vocational teachers of the occupational area are critical to the development of valid applied academic classes. They may need to be "sold on applied academics" so they will willingly provide needed information to the applied academic teacher. Often the applied academic teacher is new to the program and school and may be hesitant to ask for vocational teacher help.

3. Q. Is it possible to show daily correlation of applied academic principles in the vocational labs?

   A. Certainly not on a day-to-day basis. Communication is easier to show frequent or daily application as there is more frequent and universal application of those principles than may be the case in math and science.

   Vocational teachers can help students understand the application of principles by making lab assignments or even homework assignments, where students must show application of the appropriate academic principles in the occupational context.

   As a reviewer looks at the student performance objectives in both the courses of study of the applied academics and the vocational, there should be evidence of correlation between the two documents.

Marketing

Marketing of the state agencies' perspective on the relationship between vocational education and graduation requirements took place in a variety of ways, many of which have already been described. These include using state forums such as conferences, formulating new policies such as program approval processes and criteria, conducting in-service workshops, and developing promotional materials such as handbooks and brochures.

An additional strategy used in Ohio was that of funding a series of pilot sites to try out new arrangements. As described by a state official:

> We initiated the nine pilot programs and one of the things that we said to them, "We want you to try out some different things." The nine were just selected of people coming to us and saying, "Can we have more flexibility"... and so we didn't put out an RFP, we just said, "Those that have come to us and said, we have an idea we'd like to try out". We formulated some guidelines and two of the guidelines ... I'll share with you. One was that the elementary and secondary (academic) requirements had to be met. And secondly, that the applied academics (by that time we had identified math, science and communications) are areas we wanted strengthened. And so the pilot programs had to address those two things at least, plus they had to be cost effective, and something that we could implement statewide.

Facilitators and Barriers

At each of the study sites, informants were asked to describe factors that served as facilitators and barriers to moving ahead with desired relationships between vocational education and high school graduation requirements. As the data were analyzed and factors identified, it turned out that facilitators and barriers were really positive and negative ways of viewing the same factor, respectively. Therefore, in the presentation of findings which follows, only one set of factors is presented, sometimes with illustrations of the factor from a facilitator (positive) or barriers (negative) perspective, or both. These factors represent a listing of considerations which should be given some thought in developing and implementing a position and process for relating vocational education and graduation requirements.

Rapport Between Academic and Vocational Teachers

The most frequent factor cited for evolving a substantive relationship between vocational education and graduation requirements was good rapport between academic and vocational instructors. As one vocational director pointed out, "...when a few teachers won't sit down together that's when your problems start." Or another, "I think that probably the single largest factor is the teachers being able to relate well to the people in that other department, and have their respect--the road is smoother. That does not get rid of all the problems, but the road is certainly smoother." A vocational teacher whose course is given credit toward science requirements notes:

> So we have a relatively good working relationship (with science teachers), and I think that's a big plus. That's very important. You can't, if you're going to do something like this, you cannot do something behind another department's back and then try and slide it through, because there's going to be a tremendous struggle involved. And if there isn't cooperation, it's going to be very hard on that person who is trying to teach that.

From the descriptions we heard relating to rapport, it is a characteristic that, where it exists, has been given attention for long periods, rather than just when it is needed. If a relationship between vocational education and academic requirements is to be initiated, it would be prudent to start in areas where the vocational and academic teachers already have good rapport and communications. The factor of rapport was cited as being equally important at the local and state level of education.

Knowledge of Required Academic Content

Another frequently mentioned factor was the knowledge by vocational educators of the content of academic courses which would need to be taught for the courses to be considered alternatives or options. This knowledge is important for vocational educators in order for them to be able to accurately communicate the academic content which is being taught in their courses. As noted by a local school curriculum specialist, "We had trouble the first year even getting the vocational teachers to tell us what math was included in their course. They didn't know. They simply could not do this. The language, the concept of math." A local vocational director described the leadership provided by the local school principal in this regard as when the principal took the lead in asking the science department to share their student learning objective with the vocational instructors and asking the vocational instructors to review the objectives in terms of their own courses to see which were covered, how it was done, and give some specific examples.

Changes in School District Enrollment

Several informants noted that it was much easier to implement relationships between vocational education and graduation requirements in districts where school enrollments were increasing, rather than decreasing. When enrollments are decreasing, the concern about job security of the teachers becomes an important issue and is difficult to separate from purely curricular concerns. As commented on by a school principal:

> Teachers, God bless 'em. But they're real concerned about me (themselves) and mine, and my department and whatever, and they just kind of wanted to say, "well...". I think maybe that came in retrospect, too, at times of cutting. Anytime there's times of cutting, people are saying, "Well, I'd better protect myself." By golly, we can maybe keep a staff member here that might be cut, otherwise if we just say, "Everybody has to take a science requirement, it has to be in our department. Therefore, we need this many staff members to take care of that."

This perspective is equally prevalent with vocational education as noted by an administrator in Ohio where the applied academic concept was being implemented:

> We had, probably one of the biggest political issues, was the job security threat to vocational teachers. If I had to answer that question once, I must have answered it a hundred times, because the allegation was that we eventually would cut their vocational staffing by 50 percent.

The point is that the context of declining enrollments seems to aggravate the threat to teachers' job security, thereby adding resistance to change, cooperation, and options--perhaps at a time when most needed. As advice, it was suggested that it was easier to implement the use of vocational education to meet academic graduation requirements in districts where overall enrollments were increasing and teachers were being hired rather than riffed.

Communication Within the School District

A facilitator noted as important was good communication networks among administrators, curriculum specialists, counselors, and teachers within a school district. With good communications, all personnel are better informed of system goals, the learning content of each other's programs, and experience at building cooperative relationships. As a local vocational director states:

> When you're not communicating, which is often the case so far as the teachers, and a lot of administrators do not have a sense for vocational education, most of them come from the academic side of the curriculum. It is very, very difficult

to convince them and that is where I sense the biggest problem is.

Image of Vocational Education

When vocational education is viewed as providing important learning content and doing it effectively, this situation was suggested as a facilitator of using vocational education to meet graduation requirements or at least entering into discussion about this possibility. As a local counselor noted about vocational education, "We didn't want the picture out there that this is the place you come when you can't go anywhere else." Marketing or enhancing the image of vocational education while trying to serve lower academic ability students was suggested to be a real dilemma for vocational education. Part of the key to establishing the image of vocational education pointed out by some of the informants was "taking time to explain" what vocational educators do to others, particularly school administrators.

Support by Key Individual or Groups

Several individuals and groups were mentioned frequently as being key to initiating and implementing the use of vocational education to meet academic graduation requirements. Most frequent was mention of support by the superintendent, principal and local school board. Also mentioned were counselors, curriculum specialists and academic teachers. The support of academic teachers who are credible with other academic teachers was suggested as being especially influential. At the state level, support from the state board of education, state agency staff, and legislature were deemed to be important facilitators. State board policy and legislation supporting or mandating the relationship had significant statewide influence. Other groups noted as being important facilitators were postsecondary institutions which needed to accept vocational education courses as having met academic entrance requirements and general community support for vocational education as an important part of the high school curriculum.

District's View of Self

A facilitator noted in several instances was the district's perception of itself as unique, risk taking, and a "lighthouse" district. In districts holding this perception of themselves, the staff thought of themselves as more proactive and willing to try new items, such as using vocational education to meet graduation requirements.

Involvement of Those Concerned

Involvement of those affected was viewed as an important facilitator. This factor was communicated quite straightforwardly by a state level vocational administrator:

> One thing I guess we also found out is that in the local district, if the process gets started out very negatively, it's very hard to put into place. The players all have to be agreeable, particularly the teachers..., if they can't get together and be friendly about this and work on the process you're in trouble. So that's a really important key in starting this to make sure that everyone is brought into the process before it's started...I think those districts that have been able to make this happen have worked at the process very carefully and they'll talk about that...

Definite Process to Put in Place

A state level vocational official made this point:

> ...there has to be a process. That's where people have got into trouble, then they get everybody turned off. So there has to be a process in how you're going to do this. You can't just have the principal come in tomorrow and say to the superintendent, okay, next week we're going to have equivalency between...

Current Trend in Curriculum Reform

From the discussions at study sites, it was evident that school personnel are aware of the current trend toward "back to the basics" and academic excellence. This trend is viewed as a barrier to using vocational education to meet high school graduation requirements. A vocational director suggested that some school personnel view vocational education courses in the context of this trend as a "second-rate" type of credit. Another local vocational director noted, "The academic establishment is having a field day. They're at the top of the heap, and they're getting even for all of the, at least imagined, slights over the past 15 years, and they're whacking us."

Perception of High Quality Teaching

If the vocational teacher who is the instructor for the vocational education course has a good reputation in the school for high quality teaching, this factor was suggested as an important facilitator to using the course for graduation requirements (given there are also curricular reasons for the alternative). A local school superintendent made this point as follows, "...is a master teacher, he is a master vocational educator, and he's an academician besides. If it wouldn't have been for...and his academic credibility, science would've never bought into it." On the other hand, if the reputation of the teacher is poor, this perception can serve as an additional barrier. A local vocational director notes, "...If the teacher is always in trouble, and is not highly regarded, then no matter what your curriculum says, you won't get it..."

Shortage or Surplus of Teachers

With respect to this factor, the point made was that if there is a shortage of academic teachers in a particular school or area of the state, it is easier to gain consideration of using vocational education courses to meet academic graduation requirements. The opposite was suggested to be true if there was a surplus of academic teachers.

Extent of Actual Use of Equivalence

Local vocational directors explained that often the perceived threat for academic enrollments by substantial use of vocational education courses as a substitute is a myth. They stress that an important facilitator is to have accurate estimates of the actual number of students likely to use the equivalency. If it is small, there may be much less resistance to the policy of using vocational education courses to meet academic graduation requirements. One vocational director made this point as follows:

> ...the English department (in a particular school), which has a captive audience of the whole student body which is 300, was concerned about making anything equivalent because it might take all the students out and they might not have an English department left. What they've shown now is the last 2 or 3 years, that they're only equivalencing 3 or 4 students.

The point is that these changes and extent of their use need to be "kept in perspective."

Request by Students

A facilitator suggested by at least one school superintendent was whether or not students requested the need for using vocational education for meeting graduation requirements. The person suggested that student demand was an important consideration in putting their arrangements in place.

Resource Implications for Other Courses

A state vocational director noted that the use of vocational education to meeting academic graduation requirements released special education funds being used for other uses in the school.

This was viewed as a significant incentive or facilitator to the arrangement.

Academic Credit for Vocational Education and Vice Versa

Although none of the informants specifically mentioned a request that vocational education credits be given for an academic course, a few suggested that this could be a facilitator of the relationship. A significant possible consequence noted for the "vice versa" was that schools could then also request the use of vocational education funds for academic courses. On a different dimension of structure, informants noted that where vocational education courses use several periods as a block of time (i.e., students meeting in one course for 2 or 3 hours) it is easier to identify enough academic content to satisfy requirements for a meaningful amount of academic credit.

Flexibility and Sufficient Time for Putting Process in Place

Several local vocational directors pointed out that lack of time to analyze the vocational courses and work out relationships with academic departments was the "biggest hindrance" to moving ahead with the relationship. Related to this by the directors was the importance of flexibility in curricular plans for specific vocational education courses (and teachers) to accommodate additional academic content.

Solid Funding for Vocational Education

A local vocational director noted that solid (adequate) state funding for vocational education was a facilitator because it generally improved the quality and stability of vocational education programs. This position of strength made the request for relating vocational education to graduation requirements less threatening to vocational education.

Working Out the Teacher Certification Issue

The issue of whether or not the teacher must be certified in a particular content area before credit is granted has already been described. Informants noted that some flexibility on certification can be an important facilitator to the using of vocational education to meeting academic graduation requirements.

Have It in Writing

Several informants stressed that it was important to have any equivalencies between vocational education and academic course requirements put in writing. Once in writing, this information should be put clearly in registration bulletins and communicated to all school staff if the relationship is to be facilitated.

Field of Vocational Education

Apparently, the process of relating vocational education to academic graduation requirements is easier for some fields of vocational education than others. As one local vocational director noted:

> ...accounting...wasn't too bad for math, but I think there's been some real hesitancy by English teachers to accept business and office. Where as in machinist or electronics, it's very easy to show the math in machinist and math and science in electronics...Now some of your service occupations, that's not easy. Like your food service and merchandising.

Structure of School Day

The point made in relation to the structure of the school day was that if there are more class periods in the day (i.e., seven), students are less likely to have to make a choice between vocational education and academic courses that more directly relate to graduation requirements. Where students do not have to make this choice, there is less interest in relating vocational education to meeting academic graduation requirements.

Using an Advisory Committee

Some of the successful relationships between vocational education and graduation requirements described by informants were guided by advisory committees acting to facilitate the process. As one local vocational education director stated, "We basically started with an advisory committee before we got our courses under way. This advisory committee included home school principals, counselors, and teachers."

Adequacy of Educational Funding

School administrators noted that a very basic facilitator (or barrier) to relating vocational education to high school graduation requirements is the level of overall funding for education in a state or school district. An example given was that with adequate funding, team teaching by vocational and academic teachers in the same class can occur, thereby facilitating the granting of academic credit for a vocational course offering.

Consequences

In each of the study sites, informants were asked to describe the educationally related consequences of implementing arrangements for relating vocational education to graduation requirements. A series of consequences derived from these discussions are described below. Most frequently mentioned were the increase of academic content in vocational education courses and improved working relationships between vocational and academic teachers.

Increased Academic Content in Vocational Education

A very frequent response with few exceptions to the question of consequences of relating vocational education to graduation requirements was a change in the curricular content of vocational education courses. Academic content of vocational education courses was emphasized and more academic content was added in some cases. In most cases, this shift was viewed positively, but others saw some negative implications. A vocational teacher notes, "...people recognized suddenly this (change) had the potential of making their vocational education pretty wishy-washy...The concern about actually weakening the real, for sure vocational education, hit a couple of those folks pretty hard." In Ohio, some actual data had been collected supporting a conclusion that students with access to applied academic courses performed better on both standardized (academic) tests and vocational achievement tests than students attending regular academic and vocational courses.

Improving Working Relationship Between Academic and Vocational Teachers

As a state vocational director points out, "We have partnerships with general education that we did not have." In another state, a state vocational administrator tells a similar story about consequences: "The math teachers and the vocational teachers are really working together and are very supportive of each other. They're learning from each other..." A local vocational director in another state shared a similar view: "...the fact that we're bringing physics teachers and working with woodshop and metals teachers, and that's something that five years ago would have been unheard of..." It is evident from the descriptions that putting in place a new relationship between vocational education and graduation requirements has resulted in more interaction between vocational and academic teachers, often leading to improved working relationships.

More Positive Image of Vocational Education

Several informants pointed out that with a policy granting the opportunity to use vocational education to meet graduation requirements, vocational education courses were perceived to have higher standards and increased rigor. However, a caution raised with respect to image was that if vocational education is viewed as a "second class" or "easy-out" way to meet academic requirements or as a way for academic teachers to "get rid of" students not performing well in regular academic courses, the positive effects on the image of vocational education might be substantially reduced or even reversed.

Making Academic Content More Relevant for Some Students

A teacher of applied mathematics in Ohio expressed this perspective for students:

> I guess I would call what I taught before, I taught everything from nuts and bolts math up to trig. You know, everything in between. It was so generic, so non-applied. It was so 'yeah, we have to do this because we have to do this so that we can do this later in the book.' And now, I don't even have to answer that question. If I do the job right, that question never has to be answered. You know, 'Why do we have to learn this junk?' is just irrelevant.

Important to maintaining the close tie of academic and vocational education, and thereby the relevance, was felt to be the coordination plan required for applied academic courses in the Ohio system.

Increased Questioning of Teacher Certification Requirements

With expanded use of vocational education to meet academic graduation requirements, there was more pressure to consider limiting granting of credit for related academic courses to only where teachers were certified in the academic course area. Perhaps this was to insure quality academic learning, or simply a means to ensure that large groups of students did not use alternatives to regular academic courses.

More Questioning of How to Record Substitutions on Official High School Transcripts

A variety of approaches were used to document on high school transcripts where vocational education was used to meet graduation requirements. In some cases, for example, the transcript would list the vocational course (i.e., horticulture); in others it would list the academic equivalent (i.e., science). In several cases, informants did not know how the relationship was being recorded on transcripts. The consequences of how the listing is made on transcripts was found to be important when students applied for admission to some colleges and universities. Some universities were not accepting vocational education courses in place of regular academic courses, even though local school or state policy made this acceptable for graduation. Leaving policies largely up to local school districts made this issue very complex and difficult to sort out.

Increased Enrollments in Vocational Education

In a few sites, informants claimed that one of the consequences of the relationship between vocational education and academic requirements was increased enrollments in vocational education courses (or at least smaller declines).

Special In-Service Education Required for New Teachers

In some sites informants pointed out that the closer relationship between vocational education and academic graduation requirements caused a need for special in-service preparation for new teachers so that they could give appropriate attention to the new or emphasized academic content in vocational education.

Gifted Program for Vocational Education Students

In Virginia one of the "spin-off" consequences of relating vocational education to graduation requirements was the extension of "giftedness" to students who do very well in vocational education courses.

New Roles for Vocational Educators

In Ohio, with vocational teachers spending more time in class under the new structure including applied academic teachers, specialized assistants were being added in some schools to cover job placement functions and attendance coordination (previously handled by vocational teachers).

Vocational Teachers Learning More Academic Content

Not only are students learning more academic content, but in Ohio another consequence is that vocational teachers are learning more of this content through their team teaching or "sitting in" when their students are being taught by applied academic teachers.

Vocational Education Perceived as More Flexible

Again in Ohio with the addition of applied academic teachers and changing structure of the school day in secondary vocational centers, vocational education was perceived as more flexible by local school administrators.

Positive Support by Parents and Community

Informants in two states responded that support for vocational education's relationship to graduation requirements was receiving positive support from parents and the wider community.

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

The conclusions and recommendations from the study findings focus on three major questions: (a) Should schools be encouraged to use vocational education to meet high school graduation requirements in other subject areas, (b) if this relationship is to be encouraged, what process should be used, and (c) how can the process be facilitated?

Vocational Education and Graduation Requirements

In regard to the first question, should schools (and states) be encouraged to use vocational education to meet graduation requirements in other subject areas, the study findings raise a more basic policy question. Stepping back for a moment, vocational education could be addressed in graduation requirements in the following ways: (a) graduation requirements could specifically require study of vocational education, (b) graduation requirements could specify that vocational education could substitute for study of other subjects (i.e., mathematics, science), (c) graduation requirements could specify study of electives with vocational education included as one area of electives, and (d) graduation requirements could be silent about the study of vocational education. This study focused specifically on only one of the above options--states (and schools) where graduation requirements specified that vocational education substituted for study of other subjects (i.e., mathematics, science).

Even with this limitation, as the study progressed and its design and findings were discussed, particularly by the project Advisory Committee, a major, unanticipated policy recommendation emerged. The recommendation was that serious policy consideration should be given to asking a significantly different question than should schools (and states) be encouraged to use vocational education to meet graduation requirements for other subject areas. Rather, the real policy question should be: Should the format and substance of graduation requirements be changed from a listing of traditional (academic) subjects with seat time to a more precise description of learner outcomes for which schools and students are held accountable? In this new context, schools would have the freedom and responsibility to devise ways for students to reach the desired learner outcomes. That is, for example, if the outcomes can be acquired through vocational education courses, then these courses could become viable options to meeting graduation requirements. The relationship to be addressed is between courses (as options) and learner outcomes and not courses to courses (i.e., vocational to mathematic courses). Each course would be evaluated in terms of its contribution to approved learner outcomes. In effect, this change of questions considerably alters the policy direction and resulting policy options.

Relating Vocational Education to Graduation Requirements

However, if graduation requirements remain in their present format and one were to accept that schools should be encouraged to relate vocational education to this general pattern of requirements (and not ask a different overall question as recommended above), then the findings of this study provide focused policy direction. First, the findings suggest that the expected consequences of encouraging this relationship would be as follows:

- Increased academic content in vocational education
- Improved working relationships between academic and vocational teachers
- More positive image of vocational education
- Academic content made more relevant for some students
- Increased questioning of standards and role of teacher certification requirements
- More attention to the way in which the relationship is recorded on official high school transcripts
- Increased enrollment in vocational education

These consequences result from existing policies which address a series of questions regarding the process for relating vocational education and graduation requirements. Aspects or dimensions of the process which need to be addressed by policies are as follows:

1. Incentives for developing the relationship -- Apparent from the findings is that viable incentives include: (a) meeting the needs of a diverse group of students, (b) enhancing the learning of basic skills, (c) reducing drop-out rates, (d) providing alternatives for students with very special learning needs, (e) giving increased choice or options for all students, (f) preserving a role for vocational education in the curriculum, and (g) looking to the future needs of all students for a sound education.

2. Ways of describing the relationship -- The study findings suggest that terms will have to be selected which appropriately describe or give meaning to the desired relationship between vocational education and graduation requirements. These words can vary from giving the perception that the relationship between vocational and academic courses is that of being very equal (e.g., alternatives, options), to that of vocational education being subservient to academic courses (which are used as the standard for measuring the value of vocational education) (e.g., waiver, exemptions, substitution, equivalence). The recommendation is that some attention go toward selecting the appropriate term and then using it consistently in the process.

3. Processes to develop and maintain the relationship -- The schools and states examined in this study had developed the following process components supporting the relationship between vocational education and graduation requirements: (a) appraising the vocational courses for academic content; (b) assuring appropriate staffing for the vocational courses; (c) monitoring continued attention to academic content in vocational courses; (d) publicizing the relationship to students, parents and school staff; and (e) special funding to support the relationship. In addition to attention to these process components in schools, a series of functions were identified as being unique to the state's role in developing and maintaining the relationship. These functions included: (a) initiative and leadership, (b) policy interpretation and granting exceptions, (c) appraisal of the curriculum at the state level, (d) formulation of guidelines and standards (e) in-service education for school staff, and (f) marketing of the relationship. In developing and implementing a particular relationship between vocational education and high school graduation requirements, the above issues should have deliberate attention by state and local policy makers. The more detailed discussion in the finding section of the study provide a sense of the range of responses and their effects. For example, the appraisal of vocational course for content related to graduation requirements can vary from very formal to informal. Illustrations of this range in procedures with discussion of the detailed processes and effects as provided in the finding section should be informative in working out a policy response in a particular context.

Dealing with Barriers and Facilitators to the Relationship

Again, if the relationship of vocational education to graduation requirements is to be encouraged, study findings point to an array of barriers and facilitators which should be considered in the policy making context. In promoting the relationship, facilitators should be used to help the process run more smoothly and barriers should be anticipated to avoid slowing up and misdirecting the process. The factors which should be given some thought in developing and implementing a position and process for relating vocational education and graduation requirements in a particular situation include:

1. Rapport between academic and vocational teachers
2. Knowledge of required academic content by vocational teachers
3. Changes in school district enrollment
4. Communication effectiveness within the school district
5. Image of vocational education
6. Support by key individuals and groups
7. District's view of self
8. Involvement of those concerned
9. Clearly defined process to put in place
10. Prevailing trends in curriculum reform
11. Shortage or surplus of academic teachers
12. Requests by students

A review of the findings section as it pertains to each of these factors will suggest more detailed analysis and implications regarding each factor in using it as a facilitator or avoiding the factor as a barrier.

Summary

This study investigated the ways in which vocational education is related to high school graduation requirements in a diversity of contexts. In addition to producing descriptions of a variety of relationships in practice, a series of policy issues needing attention in developing and maintaining these relationships were identified for closer scrutiny and analysis. Where relationships of this kind are to be encouraged, the findings portray areas for policy focus likely to have good pay-off to effective implementation. Hopefully, the detailed description and analysis will foster a deeper understanding of the dimensions which should be paid particular attention in new contexts where the relationship between vocational education and graduation requirements is in question. Uncovered in the process of analysis was the need to ask a larger question, that of the most appropriate way to describe graduation requirements and their relation to curriculum structure and content, prior to encouraging or discouraging particular relationships between vocational education and graduation requirements.

REFERENCES

Barlow, M. (1986). Vocational education and general education. Thrust, 15-16.

Betts, D. (1986). Halfway home and a long way to go: A report of the 1986 Commission on the future of the South. Chapel Hill, NC: Southern Growth Policies.

Bishop, J. (1986). Occupationally specific training in the high school. In G. Copa, J. Plihal, and M. Johnson (Eds.): Re-visioning Vocational Education in the Secondary School. St. Paul, MN: University of Minnesota, Minnesota Research and Development Center for Vocational Education, pp. 93-119.

Brown, K. (1984). The vocational approach to math and science. Vocational Education Journal, 59(7) 35-36.

Chialtas, C. (1986). A future for vocational education in California...or the lack thereof: You decide. Thrust, 11-12, 42.

Copa, G. H. (1984, August). Vocational education in the secondary school. Paper presented at the Symposium on the Mission and Minimum Requirements for Secondary Vocational Education sponsored by the Minnesota State Board of Education, St. Paul, MN.

Copa, G. H., Plihal, J., Scholl, S., Ernst, L., Rehm, M., Copa, P. M. (1985, December). An untold story: Purposes of vocational education in secondary schools. St. Paul: University of Minnesota, Minnesota Research and Development enter for Vocational Education.

Copa, G., Daines, J., Ernst, L., Knight, J., Leske, G., Persico, J., Plihal, J., and Scholl, S. (1985). Purpose of vocational education in the secondary school. St. Paul: University of Minnesota, Minnesota Research and Development Center for Vocational Education.

Copa, G. H., Plihal, J., and Johnson, M. A. (1986, December). Re-visioning vocational education in the secondary school. St. Paul: University of Minnesota, Minnesota Research and Development Center for Vocational Education.

Copa, G. H., Plihal, J., Scholl, S., Ernst, L., Rehm, M., and Copa, D. M. (1986, June). Purposes of vocational education in secondary schools of Minnesota: Some insights from current *practice*. St. Paul: University of Minnesota, Minnesota Research and Development Center for Vocational Education.

Copa, G. H. (1984). The comprehensive high school and vocational education: Insights from the past. *Vocational Education Journal*, *59*(7), 30-32.

Copa, G. H. (1983, December). *The comprehensive high school as a context for vocational education: An historic perspective*. Paper presented at the American Vocational Education Research Association Annual Meeting, Anaheim, CA.

Costa, A. (Ed.). (1985). *Developing minds: A resource book for teaching thinking*. Alexandria, VA: Association for Supervision and Curriculum Development.

Dyrenfurth, M. (1985). State trends in graduation requirements: A national survey. *Vocational Education Journal*, *60*, 43-46.

Eisen, N. (1986). Is there anything wrong with vocational education: If so, what's the cure? *Thrust*, 8-10.

Frantz, N., Jr. Strickland, D., and Elson, D. (1986). *A report of high school graduation requirements and enrollment patterns in high school vocational education programs in the United States*. Blackburg, VA: Virginia Polytechnic Institute and State University.

Goodlad, J. (1983). *A Place Called School*. New York, NY: McGraw-Hill Book Company.

Halprin, M. (1984). Basic studies and vocational education. *Vocational Education Journal*, 24-27.

Halprin, M. (1984). (Incorporating basic skills into vocational education: Toms River, New Jersey). Unpublished manuscript.

Lotto, L. (1983). *Building basic skills: Results from vocational education*. Columbus: The National Center for Research in Vocational Education, Ohio State University.

National Commission on Secondary Vocational Education. (1984). *The unfinished agenda: The role of vocational education in the high school*. Columbus, OH: National Center for Research in Vocational Education, Ohio State University.

Parks, D. and Henderson, G. (1984). An agenda for action. *Vocational Education Journal*, *59*(7), 37-39.

Parks, D. and Henderson, G. (1985). Strengthening academic foundations of vocational education programs. In A Guide to Implementing the Carl Perkins Vocational Education Act. Arlington, VA: American Vocational Association, pp. 43-52.

Perlez, J. (1987, March 1). Dropout problem is worsening. The New York Times.

Plihal, J., and Copa, G. H. (1986). Diversity of purpose in vocational education. Educational Horizons, 65(1), 38-41.

Pucel, D. (1984). An alternative approach to learning. Vocational Education Journal, 59(7), 42-44.

Saul, C. and Gull, H. (1985). Opportunities for vocational education in the educational reform act of 1983 (Senate Bill 813). Sacramento: California Advisory Council on Vocational Education.

Serow, R. (1986). Credentialism and academic standards: The evolution of high school graduation requirements. Issues in Education, 4(1) 19-41.

The National Center for Research in Vocational Education. (1986). Improving the basic skills of vocational technical students: An administrator's guide. Athens, GA: American Association for Vocational Instructional Materials.

APPENDIX A

Survey to Identify Potential Minnesota Sites

Name____ Phone____________

District or Center____

Vocational Education and High School Graduation Requirements (Grades 9-12)

1. In your district(s) do any vocational courses receive academic credit (9-12) which can be applied toward high school graduation requirements (e.g., agriculture education may qualify as a science unit)? _____Yes _____No

   If yes, do they qualify as meeting local requirements, state requirements, or both?

2. Are there any plans to request vocational courses receive academic credit for graduation requirements?

3. Please list any vocational courses which qualify for academic credit.

Course Title	Academic Unit
1.	1.
2.	2.
3.	3.
4.	4.

4. Is School Board approval required to grant academic credits for participation in vocational programs? _____Yes _____No

5. Is there a graduation requirement for vocational education in your district(s)? _____Yes _____No

6. Are any of your vocational teachers licensed to teach academic courses? _____Yes _____No

7. Please list other districts that you are aware of now offering academic credit for vocational courses.

Please complete this questionnaire and return to Dayton Perry before leaving.

Thank you for your cooperation!

APPENDIX B

State and Local School Interview Protocols

Vocational Education and High School Graduation Requirements
Minnesota School Interview Protocol

Review of the purposes of this project, scope, and interview details (taping, etc.)

Identify schools where VoEd courses meet graduation requirements.
Define policy issues which need to be addressed.
Describe alternative resolutions to these issues.

Introduction

1. Within the last five years, what have been the trends in vocational education in your district?

   Have you seen any changes in enrollments, course offerings, staffing?
   Do you have any hard data readily available to describe these changes?

2. What do you see as the causes of these changes?

   Has the total number of graduates changed?
   Have your school's graduation requirements changed?
   Has the change in the State requirements for offerings or for required courses had any effect?
   Have changes in college entrance requirements had any effect?

3. What are your high school's graduation requirements? (Obtain a copy--courses, hours)

   Do you have learner outcomes as requirements for graduation? (Copy)
   How have your high school's graduation requirements changed in the last three years?

Vocational Education

4. Do any of your vocational education courses qualify to meet your school's graduation requirements?

   Do any of your vocational education courses qualify to meet state offering requirements?

   Do any meet state graduation requirements?

   Which ones and for what?

5. What terms do you use to describe this arrangement (substitution, alternative, equivalence, etc.)?

6. When was this arrangement developed? Implemented?

7. Who initiated the process of gaining approval for this arrangement?

    Were vocational and nonvocational teachers involved?
    Who else became involved, and to what extent?
    (principals, superintendents, committees, school board, etc.)

8. Did your district develop a written policy or provision for this arrangement?

    Who was involved in its development?
    Have the provisions been communicated to schools, teachers, principals, parents and students?

9a. What barriers or problems did you encounter in the development of this arrangement?

    Where did they occur?
    What were the issues?
    How were they resolved?

9b. What events, individuals, activities helped facilitate development of this arrangement?

10a. What problems were encountered in the implementation of the arrangement?

    Where did they occur?
    What were the issues?
    How were they resolved?

10b. What events, individuals, activities helped facilitate implementation?

11. Do teachers of courses now specifically addressing graduation offerings/requirements support the arrangement? Why or why not?

12. What criteria were used to determine how many units of credit for required offerings or graduation-required courses would be granted to a vocational education course?

13. How are vocational courses (satisfying graduation requirements) listed on a student's transcripts? For instance-Horticulture in place of Life Science.

Examples:
- Actual course title with, say, science credit granted,
- Science course title (for which the vocational course counted) only,
- Actual course title with number of total credits required for graduation reduced. No "credit" for the science course substituted is listed as such (as when an allowance is made when a vocational program is completed).

14. What content changes have been made in vocational education courses to meet required offerings or graduation requirements?

    Do you believe these were desireable changes?

Future Outlook

17. What do you see as the trend in using vocational education to meet high school graduation requirements in your state?

    Will it increase or decrease? Why?

18. What is the prevailing attitude toward the future of high school vocational education in your state?

19. What are the issues and trends facing vocational education at the high school level in your state?

Vocational Education and High School Graduation Requirements
State Level Interview Protocol

Review of the purposes of the project, scope, and interview details (taping, etc.)

Identify states and schools where vocational education courses meet graduation requirements.
Define policy issues which need to be addressed.
Describe alternative resolutions to these issues.

Introduction

1. Within the last five years, what have been the trends in vocational education in your state?

    Have you seen any changes in voc enrollments, course offerings, staffing?
    Do you have any hard data readily available to describe these changes?

2. What do you see as the causes of these changes?

    Has the total enrollment changed?
    Have state or district graduation requirements changed?
    Have these changes had any effect?
    Have changes in college entrance requirements had any effect?

3. What are your state graduation requirements? (Obtain copy)

    How do district requirements compare?
    Do you use learner outcomes as requirements for graduation?

Vocational Education and Graduation Requirements

4. Is there a provision in state legislation regarding the use of vocational courses as alternative means to satisfy course requirements for graduation? (Obtain copy)

    How did it come about?
    Who initiated such a provision?
    Who developed it?
    What was the motivation?
    What were key elements in the process?

5. What terms do you use to describe this arrangement (substitution, alternative, equivalence, etc.?) Do students actually receive "credit" or a "waiver" for course requirements? How does it show up on their transcripts? Has it been accepted by colleges as meeting entrance requirements?

6. To what extent do districts make use of this provision?

7. What course areas are involved in this arrangement?

   What vocational courses meet the requirements of what?

Approval Process

8. Who typically initiates a request for Equivalency credit?

   Who has the final say?
   Describe the process for obtaining approval?
   What barriers or problems are common to districts seeking approval for equivalency credit?

9. When a course is approved by the state department of education is it approved for all schools in the state for the specific school requesting approval?

10. At the district level, what criteria are used for approval? (content, teacher license)

11. Who decides what are the most commonly used methods for determining the basic skills or academic equivalency of a vocational course?

    What criteria?
    - matching course outlines
    - matching competencies
    - teacher license
    - amount of credit granted

State Programs

12. How does the state department of education inform, encourage, and assist schools in the use of vocational substitutes for required courses? What avenues has the state used (workshops, materials, meetings, newsletters, etc.)?

13. Who was involved in the design of your state-level supportive programs?
    Who was involved in implementation?
    The approval process?

14. What problems/barriers came up during the development and implementation stages of the state plan?

    Where did they occur?
    What were the issues?
    How were they resolved?

15. What events, individuals or activities helped facilitate the development and implementation of your program?

Reactions

16. Is teacher licensing an issue in your state as it relates to the use of vocational courses receiving credit in nonvocational areas?

    How is it handled?

17. What has been the public reaction to this arrangement?

    Local, State, VocEd, Nonvoc, teachers, parents, students

18. What effects has this arrangement had on trends in VocEd in your state?

    How do you feel about the arrangement?

Future Outlook

19. What are your expectations about the future of this arrangement in your state?

20. What is the prevailing attitude toward the future of high school vocational education in your state?

21. What are the issues and trends facing vocational education at the high school level in your state?